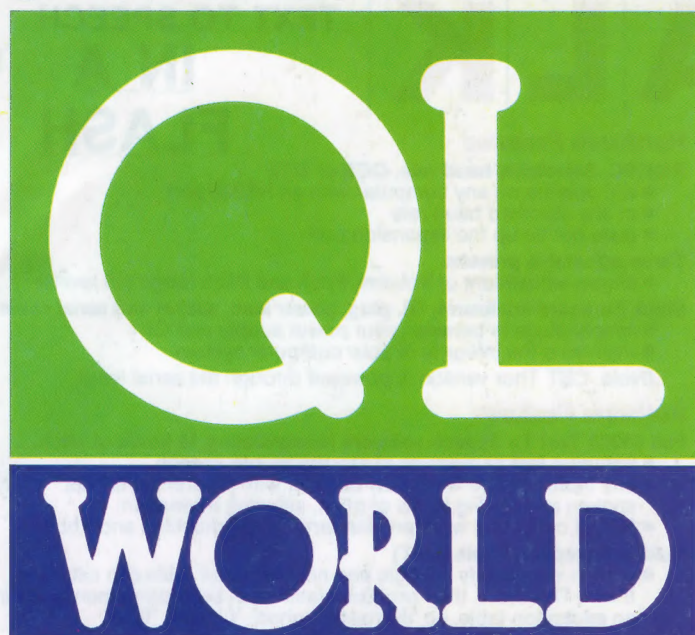


S I N C L A I R



Every month **£1.25** December 1987

DENMARK DKR 40.00

GERMANY DM 9.00

NETHERLANDS DFL 9.25

SWITZERLAND SFR 6.50

**The U.S.
connection**



**Psion
revisions**

**Super-fast
screen
handling**

EPROMs
— the works

Introducing

QTALK

TEXT TO SPEECH IN A FLASH

Hardware Features

RS232C, Selectable baud rate, DCE or DTE

- will operate on any computer with an RS232 port
- at any standard baud rate
- does not tie up the expansion port

Three adjustable presets:

- allows adjustment of Volume, Pitch and Pitch range (16 levels)

Black Eurocard enclosure, QL plug, power lead, socket and serial cable

- simply plugs in between your power supply and QL
- maintains the integrity of your computer system

(Note. CST Thor version is powered through the serial lead)

Software Features

Full 68000 Text To Speech software incorporating 16 levels of pitch.

- lightning fast conversion of any string into speech
- any multi syllable word may be split, with different syllables spoken at differing levels of pitch, allowing intonation
- 20K of code. Will work on standard (128K) machine and Thor

Built in Exception Table (BET)

- certain words defy all logic and no amount of rules can cater for these. Therefore, their pronunciation has been permanently set in an exception table. eg 'thorough', 'ghoti', 'Lbytes', 'flip1'

Size selectable User Exception Table (UET)

- Users can set up their own table of any size and fill it with their own words/pronunciations. This overrides words in the built in table therefore allowing translation of languages. This table can be saved and reloaded for later use.

Over 400 rules to convert text to speech.

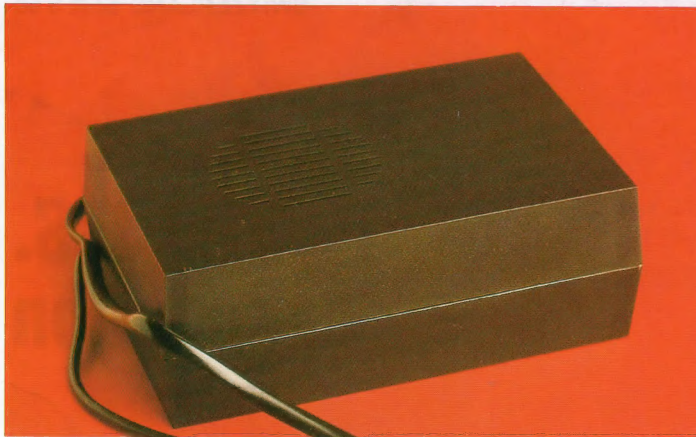
- If the word or string is not found in either table it will be pronounced via a sophisticated set of rules.

Full Device driver implementation.

- a new device called 'QTK' is added to the QL's list of devices. This means that you can use all of the built in basic keywords to send information to QTALK. eg PRINT, LIST, DIR, COPY etc. and also use QTALK with other computer languages (PASCAL, FORTRAN etc)
- a set of clever superbasic extensions is also included to make QTALK a breeze to use
- may be set to pronounce or ignore punctuation

Multitasking screen editor

- can be called up any time to set up and add, alter or delete words from the User exception table. Comprehensive on screen help.
 - Hopefully the last word in QL clocks — talking time and date
- Many more thoroughly documented features



PRICE	
Qtalk	£75.00
VAT	£11.25
Post/Packaging	£ 2.25
Total	£88.50

Qtalk Applications

1) Health

- a viable solution to speech impairment/impediment
- allows the blind to write documents and programs

2) Education

- an excellent tool for teaching the relationship between the written and the spoken word
- a valuable aid to those assisting the dyslexic or for students with reading problems
- an amazing new method for teaching or learning the translation of one language to another
- touch typing made easy with keyboard echo

3) Industry

- enables verbal output of readings/warnings from independent peripherals. (BUS, IEEE, RS232 etc)
- can be used to give instructions to an operator
- could be set up as an answerphone or entryphone

4) Entertainment

- allows the user to verbally list programs while checking them against a hardcopy listing
- can be made to hum musical tunes
- provides a whole new dimension to computer games

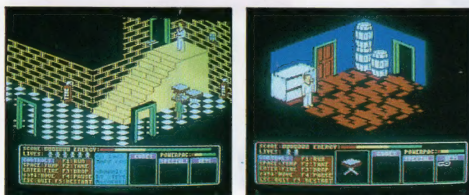
ALIEN HIJACK

The year is 2003 and you are working on the S.P.C. Forward, as ship's engineer. On the 23rd day you are attacked by an alien space ship and all hell breaks loose. You must regain control of your ship, against some mighty tough opposition.

The first TALKING game for the Sinclair QL. Possibly the most amazing QL graphics seen to date

- 3D graphics
- Full 68000 code
- 192 colour screens
- fast, dynamic, challenging
- talking hero and aliens

Note. Alien Hijack does not require QTALK to run but it certainly makes it a lot more fun. Works on a 128K QL.



PRICE	
Alien Hijack	£15.00
VAT	£ 2.25
Post/Packaging	£ 1.00
Total	£18.25

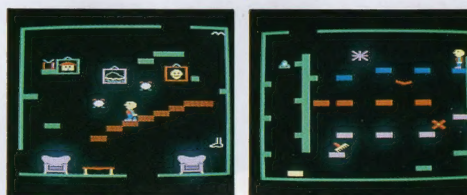
PUZZLE MANIA

Your mission, should you decide to accept, is to journey about the danger ridden cells of Maniaville to retrieve the lost loot of Lawless Lenny. Several obstacles will attempt to thwart your progress and only the smartest gamer will survive.

The second TALKING game for the Sinclair QL

- full 68000 code — 40 colour screens — fast, arcade action
- spoken clues to help you win (if you are good enough)
- Truly addictive challenge

Note. Puzzle Mania can operate without QTALK but is much more fun with it.



PRICE	
Puzzle Mania	£10.00
VAT	£ 1.50
Post/Packaging	£ 1.00
Total	£12.50

Special Introductory Offer

Buy QTALK, PUZZLE MANIA and ALIEN HIJACK and receive £5.00 discount pre VAT total

Name _____

Address _____

Please rush me _____

for my **QL/THOR** (cross out one which does not apply)
with software on 3½" disc/mdv (cross out one which does not apply)

I enclose a **bank cheque** for £ _____
or please debit my **Access/Visa card** (cross out one which does not apply)

Card number _____

Expiry date _____ Signature _____

I appreciate that no funds will be deposited until despatch of goods.
Please allow up to 21 days for delivery (airmail).

Maxtronics R&D Ltd
(New Zealand)

ORDERS TO:

CHI - SOFT: 20 Chandos Way, Wellgarth Road, Hampstead,
London NW11 7HF, Great Britain. Telephone (01) 458-7249

or

Maxtronics R&D Ltd: 26A Conway Street, Christchurch 2,
New Zealand. Telephone (64-3) 325-546

Editor
Helen Armstrong
Sub Editor
Harold Mayes MBE
Production Manager
Nick Fry
Designer
Chris Winch
Art Editor
Neil Tookey
Advertisement Manager
Perry Trevers
Assistant Advertisement Manager
Jonathon Manning
Classified Sales Executive
Carol Staniland
Magazine Services
Sheila Baker
Advertising Production
Serena Hadley
James Pyle
Managing Editor
Brendon Gore
Publisher
Trish Phillips
Group Publisher
Paul Coster
Financial Director
Brendan McGrath
Chief Executive
Richard Hease
Microdrive Exchange 089 283 4783/2952 (2 lines) TIL
Sinclair QL World
Greencoat House
Francis Street
London SW1P 1DG
Telephone 01-834 1717
Fax 01-828 0270
Telex 9419564 FOCUS G
ISSN 026806X

Unfortunately, we are no longer able to answer enquiries made by telephone. If you have any comments or difficulties, please write to The Editor, Open Channel, Trouble Shooter, or Psion Solutions. We will do our best to deal with your problem in the magazine, though we cannot guarantee individual replies.

Back issues are available from the publisher price £2 U.K., £2.75 Europe. Overseas rates on request. Please telephone 089 283 4783 to check availability.

Published by Focus Magazines Ltd., London

Distributed by Quadrant Publishing Services, Sutton.

Subscription information from: TIL, PO Box 74, Paddock Wood, Tonbridge, Kent TN12 6DW.

£15 U.K. £30 Surface mail Europe and the rest of the world. Add £5 for air mail + £10 overseas.

Typesetting by **RACING POST**
Printing by Benham & Co Ltd
©COPYRIGHT SINCLAIR QL
WORLD — 1987

CONTENTS

DECEMBER 1987

- 7 QL SCENE ● All the latest news**
- 10 OPEN CHANNEL ● QL mailbag selection**
- 14 TROUBLE SHOOTER ● Back solving consumer problems**
- 17 EPROMS PROMINENT ● How, what, why**
- 22 PSION SELECTION ● Which version is best for you?**
- 27 QL EDUCATION ● Teaching you to teach others**
- 32 SOFTWARE FILE ● Over the waves**
- 34 U.S. CONNECTION ● State of the art, Stateside**
- 38 SUPER BASIC ● Data, data everywhere**
- 42 SPEEDSCREEN ● Faster than a speeding bullet**
- 50 FOCUS SALES POINT ● New regular money savers**
- 52 THE PROGS ● Special Christmas machine code game**
- 56 MICRODRIVE EXCHANGE ● Bigger and better than ever**

NEXT MONTH

BATTLE OF THE KEYBOARDS

After a long wait it looks as if the promise of a really good outboard keyboard for the QL will finally become reality – not once, but twice. Ron Massey reviews new keyboards from Schon and Sandy, and likes them both.

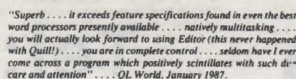
FLASHBACK

Sector Software has produced a new and user-friendly system for files independently of the conventional database format. Ron Massey finds that it has some of the advantages of a database and some of a text editor or wordprocessor.



MICROBRIDGE A NEW DIGITAL PRECISION PROGRAM!
MICROBRIDGE is a superb Contract Bridge player and bidding tutor - you can use it either for entertainment or expert tuition, or for both together! Only a very elementary knowledge of the rules of Bridge is assumed (we can recommend you a good book if you do not know anything at all about the game) - the large and lucid A4 manual (equipped with comprehensive glossary) does the rest. The program is also aimed at strong Bridge players who want to refine their skills.

To use the system for entertainment only is simplicity itself. The computer automatically



	STANDARD EDITOR	Metacomco 80	QUILL v2.35
TIMINGS IN SECONDS			
	Time Ratio	Time Ratio	Time Ratio
Load file (text) \$1	47.7 100%	54.2 81%	997.4 4%
(Quill) \$2	17.5 100%	-	27.2 64%
(other) \$1	46.1 100%	-	-
Save file	46.1 100%	151.9 30%	91.5 50%
Merge file	47.8 100%	360.0 13%	205.6 23%
Create 100 lines of 64 cols	7.1 100%	264.0 2%	264.1 2%
Define 100 line-block	1.5 100%	72.5 6%	168.1 1%
Move block led by 100 lines	1.5 100%	111 1%	227.4 1%
Copy block at bottom to top	4.9 100%	67.3 7%	c3 days 2%
Delete 100 lines	2.8 100%	205.6 1%	120.3 8%
Page from top to bottom	12.1 100%	333.8 3%	902.8 1%
Find string - case dependant			
Find string	32.1 100%	45.7 70%	48.9 65%
Find 10th occurrence	19.0 100%	36.2 52%	35.9 52%
Find 12th occurrence	0.3 100%	6.0 5%	41.1 1%
Find string A or string B	34.5 100%	-	-
Find string A and string B	32.5 100%	-	-
Find backwards	32.3 100%	42.6 75%	-
Find string as a word	32.3 100%	-	-

- Prints documents to ANY printer
- Can use ANY text feature of the printer
- Can support ANY NUMBER of "translates"
- Can support ANY translate convention
- Multiple Line Headers and Footers
- Multiple occurrence of Headers and Footers in one document
- Wholly flexible pagenumbering
- Supports Bold and Underline on ALL printers
- Single sheet or Continuous stationery
- Print whole file or specified page range
- Pause printing prior to head of page
- Abort printing at any time
- Compatible with all text files and Editor document files
- Spooling
 - F1 Specify Default Device
 - F2 Specify Printer Device
 - F3 Select Printer Type
 - F4 Commence Printing
 - F5 Quit

NAME	Introduces a new printer description set
DEV	Device. To which device is the printer connected
PRD	Baud rate. The speed at which the printer is set to receive characters from the computer
RES	Reset sequence. A control sequence which causes the printer to reset to its internal defaults
PCN	Cancel sequence. Causes all data in the buffer to be lost
PPA	Preamble sequence to be sent to the printer at the beginning of the document/fragment
PPS	Postamble sequence to be sent to the printer at the end of the document/fragment
PFH	Header margin (number of lines) to be reserved at the top of page. Any "page header" specified will occur within these lines
PFM	Footer margin (number of lines) to be reserved at the bottom of each page. Any "page footer" specified will occur within these lines
PL	Useable page length (number of lines). The amount of space within which document text will be printed
PLP	Page numbering required
PLC	Column number for default page number
PLN	Reset page number to (page number). May occur anywhere within a document, though typically at the start
PLM	Left margin (column number)
PEL	End of Line code. Specifies the control sequence to be sent at each end of line
PSS	Single Sheet printing required - pause at each page end
PFS	Pause after each page
PFB	Conditional Page Break (number of lines). If the number of useable lines remaining on the current page is less than the specified number, a page break will occur
PHD	Page header text
PFT	Page footer text
PBU	Boldface is not supported by the printer. The program should "synthesize" boldface
PUL	Simultaneous underline is not supported by the printer. The program should "synthesize" simultaneous underline
PXG	Exchange with Global effect
PXL	Exchange with Line effect
PTG	Toggle with Global effect
PTL	Toggle with Line effect

deals (deal a hand, can read a hand, can deal a hand) as well as the opposition (if you have a human partner and a second QL, the two of you can play against the computer too). You will find that you and your partner will have the better cards between you and the computer. This is because the computer is not up to your bit, it can't make a contract - you do your bit, the computer does its. The computer will comment on your bidding if you wish it to, clearly explaining why it agrees or disagrees with your bid, and what it thinks the best play is in which bid. Frequently the computer will play in your bid, the computer mimics the diagnostic thought processes of a very strong player in making its commentary. If you wish, the computer will explain the bidding in more detail. After the deal, bidding is over, you can either replay or review/change the bidding sequence if you wish - the computer will rethink responses and commentary from the changed bid onwards. This done, you will normally opt to play the deal, and the computer will assume the opposition, this is no fun being dummy! The computer will, of course, play the opposition, and will do its best to defeat the contract, through fair means: as usual, you can replay/replay as well as scan the whole deal to see what the computer needed to make, virtually every Bridge program on the market besides MICROBRIDGE cheats, the two methods of cheating are (1) the computer knows the contents of all the hands, and uses this to cheat, (2) the computer is playing this results in extremely weird bids and card play; for example, the computer never losing a finesse! (2) The computer actually switches cards between the hidden hands during play, and uses this with finesse too. The way the Bridge programs, disguise their poor bidding and Bridge programs. Needless to say, MICROBRIDGE never cheats in any way it doesn't need to! - both during bidding and play, no information is hidden from you, except the cards in the hand whose bid/play is being considered, the bidding/play so far, and the state of play) the visible dummy hand. This results in enjoyable and human-like bidding and play. In tutor mode, you can choose the chosen hand and 100 randomly selected deals arranged in 16 thematic lessons, or generate a pseudo-random deal yourself. MICROBRIDGE is an ACOL player (Blackwood and Stayman and prepared bids too) of strong club play standard, and will ask you your bid on your own, and will play the deal. It will also explain why the 'why' occupying up to 10 sentences of detailed reasoning in English - this is stunning). If it disagrees, you have the option of insisting on your bid or accepting MICROBRIDGE's advice, in fact MICROBRIDGE will play the deal in your hand (yes, you can opt to see it - and, yes, you can be tutored/tested on that hand too). When the final contract is reached you have the option of playing as declarer, as before. There are many other features, such as the ability to generate ultra-strong hands for practice at bidding and playing slam or near-slam contracts, and to return to a deal at any time via a code. MICROBRIDGE is unique, and great fun, and very easy to use. It is available on a 5.25 inch floppy expansion to run it, as well as a disk drive.

MICROBRIDGE costs just £34.95 - incredible value!
"Incorporates new ideas of real value"
 THE TIMES HIGHER EDUCATION SUPPLEMENT


If you have not received a copy of our \$2 page proofing brochure, please write to us asking for one and we will ship it to you free. If contains details of an exciting price draw too!

* Digital Precision always pays attention to feedback and suggestions from our customers: many of the program upgrades detailed in this ad have resulted from our customers' comments.

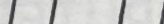
SPECIAL EDITOR (v2.05) has an instantly updated word count and a full-featured 'Document' mode (with visible fixed and auto paging etc) for those who wanted it to more closely resemble a conventional word processor - we did this without reducing its speed or flexibility as a development tool.

EDITOR now has a new 'Document' mode. The EDITORS are now supplied with an even better printer driver, which allows (among many other things) page numbers anywhere, with any message, in any style, as well as variable headers/footers thru a document! With TURBO v2.0 you get full WORD/TOOLS/THOR compatibility and the power to write to any printer - full-width or narrow.

FREE! Write to: **ROSETHACH & BORMAN (QUANTAL)**, Ta

£10  so well-written source code, a more tolerant 'FREESTYLE' mode (Rosenthal & Bonman in QUANTA). Ta!



DIGITAL PRECISION



.....
.....
.....

Postcode

Expiry date

Signature

The Best
QL software
from
 **DIGITAL PRECISION**

COMPUTERS

QL JS 2.3 software	£169
QL640 JS 2.3 software	£260
Psion 2.3 sets	£10
Psion 2.35 sets	£20

PSION ORGANISER

Organiser XP 32K	£138
128K Rampack	£100
32K D Rampack	£55
Harvester Superchip	£99
Data Organiser	£35

Z88 + mains adaptor	£297.50
32K Rampack	£20.00
128K Rampack	£50.00
QL - Z88 link	£23.00
Centronics interface	£30.00

Z 88

TK

COMPUTERWARE

the QL stockist

Tel: 0303-81-2801

DISC SYSTEMS

Dual 3.5 in. + Trump Card	£350.00
Single D/D 3.5in. drive	£125.00
Single D/D 3.5 in. & 0K SQB	£225.00
Dual D/D 3.5 in drive	£209.00
Dual D/D 3.5 in. & i/face	£295.00
Dual 3.5 in. & 512K SQB	£350.00
Cumana disc interface	£ 86.25
768K Trump Card	£199.00

SPARES

JS ROM sets	£27.50
Keyboard membrane	£6.25
Keyboard bubble mat	£3.85
ULA ZX 8301	£9.50
ULA ZX 8302	£10.25
MAB 8049	£7.50
CPU 68008	£25.80
M/drive assemblies- complete	£27.50
Voltage regulator (high output)	£4.75
Power supply UK	£23.50
Power supply European	£25.50
QL Test kit	£13.50

SUNDRIES

10 Microdrive cartridges	£17.50
Cartridge storage box	£5.50
QL Dustcover	£5.00
100 Microdrive labels	£3.75
Powerclean filter	£36.00
Eprom Programmer	£129.00
Battery clock kits	£19.50
10 DS/DD discs 3.5" (u/b)	£18.50
Joystick + adaptor	£16.00
512K internal U/G	£94.00
Centronics Interface	£19.50

SOFTWARE

BUSINESS

Flashback (c-d)	£25.00
Cash Trader (PDQL)	£80.00
Cash Trader + Analyser	£105.00
Decision Maker	£35.00
Entrepreneur	£35.00
Finance Manager	£19.00
Home Finance (Buzz)	£22.00
Investment Monitor	£20.00
Project Planner	£29.00
Small Traders Pack	£25.00
Spellbound (c-d)	£30.00
Spellbound + Filebound	£35.00
Touch Typist	£12.00
Pacioli	£25.00

UTILITIES

Archivist	£30.00
Cartridge Doctor	£13.00
Copymate	£11.00
CPM Emulator (c-d)	£45.00
Assembly Lang. Toolkit	£25.00
Desktop Publisher	£60.00
Desktop Publisher - S/Edition (d)	£80.00
Front Page (c-d)	£23.00
Front Page Extra 2 (c-d)	£40.00
ArchRTM	£20.00
ICE Eprom	£27.00
ICE Drawing Office	£15.00
Key Define	£10.00
Locksmith	£11.50
Mailfile (256K)	£20.00
PCB Designer 1	£99.00
QFLASH Ramdisk + toolkit	£19.00
QFLASH Ram Eprom	£25.00
QFLASH Ram utilities (c-d)	£10.00
Reconfigurable toolkit 2	£29.00
4 Matter	£11.50
Recover	£20.00
Sideways	£20.00
Sidewinder	£12.00
Archive Tutor	£21.00
Super Media Manager (d)	£40.00

XRef	£15.00
Compare	£10.00
Super Toolkit 2 (Eprom)	£29.00
QIM! + Giga Mouse	£70.00
QLiberator (c-d)	£60.00
QLiberator (budget)	£30.00
QLoad & Ref	£10.00
Quats	£25.00
QRam (c-d)	£30.00
QWriter 2	£20.00
Task Master (c-d)	£25.00
Speed Screen	£20.00
The Editor	£29.00
The Editor - special edition	£49.00
Turbo (c-d)	£99.00
Turbo Quill (c-d)	£10.00
Turbo Quill + (c-d)	£13.00
Ultra Print	£20.00

CAD

Concept 3D	£40.00
Eye Q	£29.00
Mandelbrot Magic	£15.00
Sign Designer	£17.00
TechniQL	£50.00
The Designer	£15.00
Viewpoint	£20.00
3-D Designer	£35.00

LANGUAGES

Assembler Workbench	£25.00
Basic-Ally	£20.00
Better Basic	£24.00
BCPL Development Kit	£51.00
C Compiler	£85.00
DevPac Development Kit	£30.00
LISP	£51.00
Macro Assembler	£38.00
MonQL (Eprom)	£30.00
Pascal (Computer One)	£40.00
Pascal (Metacomco)	£75.00
Pro Fortran-77	£92.00
Pro Pascal	£92.00

QMON	£20.00
Super Forth + Reversi	£39.00

LEISURE

Area Radar Controller	£13.00
Chess	£17.00
Cosmos	£14.00
Flight Simulator	£19.00
Matchpoint	£14.00
Bridge Player 2	£20.00
Professional Astrologer	£70.00
Super Astrologer	£25.00
Scrabble	£15.00
Snooker	£13.00
Squadron	£16.00
Super Backgammon 3	£13.00
Strip Poker	£15.00
Type 22	£18.00
War In The East:	
1 Barbarossa	£19.50
2 Stalingrad	£13.50
3 Destr. of Army Group	£13.50
War in the East (set)	£39.95

ADVENTURE (text)

Heart of Gern	£15.50
Horrorday	£15.00

ARCADE

Aquanaught 471	£20.00
Blocklands	£10.00
Archanoid	£15.00
Death Strike	£15.00
Fictionary	£11.50
Hoverzone	£15.00
Hyperdrive	£13.00
Jungle Eddi	£15.00
Karate	£15.00
Knight Flight	£15.00
Mortville Manor	£15.00
Quboids	£9.00
Stone Raider	£13.00
Tank Busters	£15.00

BOOKS

Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Technical Guide	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details

KEYBOARDS

Schoen replacement	£57
Rainbow remote	£85
Sandy IBM-style	£99
Schoen IBM-style	£99

● ALL PRICES INCLUDE VAT AND UK MAINLAND DELIVERY - WE EXPORT WORLDWIDE ●

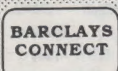
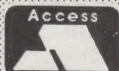
Phone for details of other QL products OR send SAE for our latest catalogue

Credit card phone orders accepted, or send cheques, postal orders, Eurocheques to:

**TK COMPUTERWARE, STONE STREET,
NORTH STANFORD, ASHFORD, KENT TN25 6DF**

TELEX

966676 PMFAB G



FAX

0303 64850

Bigger and better

With the multitude of toolkit programs from which to choose, it is scarcely surprising that QL owners are in a quandary. Further, it is always the case that whichever toolkit is chosen it is certain to lack that vital command just when you need it.

Compware hopes to solve the problem with the release of *Mega-Toolbox*, containing more than 160 new commands, aimed specifically at SuperBasic programmers. *Mega-Toolbox* commands are claimed to be largely original, complementing presently-available toolkits. The toolbox is compatible with QL SuperBasic compilers and customised versions will be available for use by software houses in their programs.

Mega-Toolbox commands include improved command line editing, job control/memory allocation commands, tune-playing jobs, alarm clocks, copying/mirroring/zooming/saving/restoring windows, a multi-tasking print command for rolling demonstrations/slide shows, 3D text printing, screen swapping, pipes, keyboard control, memory copying and fill.

The price is £29.95 including P&P. For further information contact Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA.

Qtalk

A speech synthesiser has recently been launched for the QL. *Qtalk* has 16 levels of programmable pitch and more than 400 rules to convert text to speech. It includes an exception

dictionary of the most common 25,000 words and the user may define his own exception table which may be saved to disc or Microdrive.

Qtalk is configured as a standard output device, al-

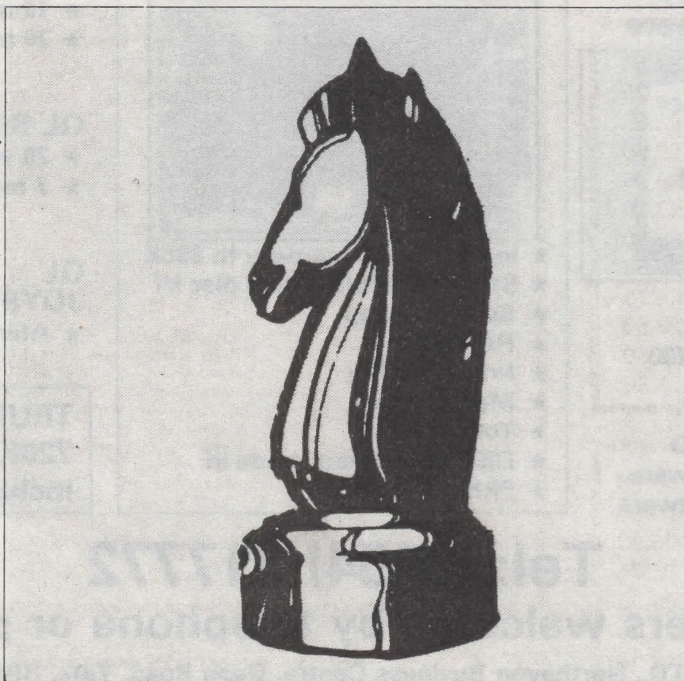
lowing files can be listed and copied to it and making it very easy to use. In addition to its obvious uses in talking programs, it can also handle Quill and Editor files.

The software requires approximately 20K of RAM, so it will work satisfactorily on a standard machine, though anybody using *Qtalk* and *Quill* simultaneously could experience memory problems.

Two games have been released using *Qtalk*, though they also operate without speech. *Alien Hijack* is a 3D arcade adventure, along the lines of the *Ultimate Knight Lore*-type games for the Sinclair Spectrum. The second game, *Puzzle Mania*, is a 40-screen levels-and-ladders arcade game. *Qtalk* costs £88.50 including P&P. *Alien Hijack* is £18.25 and *Puzzle mania* £12.50.

Qtalk is available from Chi-Soft, 20 Chandros Way, Welgarth Road, Hampstead, London NW11 7HF. The system is produced by Maxtronics R&D Ltd, 26a Conway Street, Christchurch 2, New Zealand.

Chess champion



Psion Chess has been in battle again, adding two new world titles, World Microcomputer Software for Chess and World Personal Computer Chess Champion.

The first tournament was staged in Rome by the International Computer Chess Association, with each of the seven programs playing each other. To gain the title, Psion Chess dropped only half a point in the six games, beating much more powerful machines to emerge as winner.

Personalising service

The Appointments/Sales Chasing/Follow-up Diary is now available with a special service from PDQL. If returned within 28 days from despatch, PDQL will personalise the program to suit the customer's stated requirements.

The program needs extended memory and is an

Archive/DEV application. It is designed to fix appointments, itemise pre-appointment duties, to help chase existing clients/customers and to set out future duties.

The package costs £48. For further information contact PDQL, Unit 1, Heaton House, Camden Street, Birmingham B1 3BZ.

MIRACLE SYSTEMS LIMITED

14 day full money back guarantee on all products

12 month warranty on all products

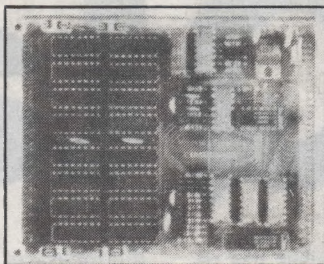
All prices include VAT and P&P

QL MODEM £49

- ### ★ New printout software



- ★ 1200/75 e.g. PRESTEL, T/GOLD
- ★ Autodial
- ★ 3 metre cable
- ★ Plugs into SER2
- ★ Includes Viewdata software
- ★ Includes 80 column software
- ★ Not BT approved

QL EXPANDERAM 512K £75

- ★ Increases QL memory to 640K
- ★ Through connector for i/f
- ★ Low power consumption
- ★ Can speed up some programs
- ★ Able to use larger Quill docs etc
- ★ Black cover included

QL CENTRONICS £19.50
PRINTER INTERFACE



- ★ Plugs into SER1 or SER2
- ★ Standard Centronics plug
- ★ Default baud rate 9600
- ★ 3 metre cable

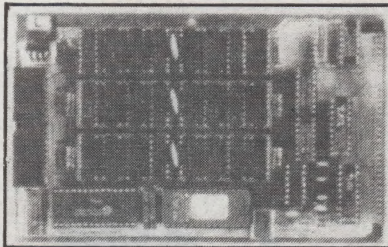
QL MODAPTOR £39

- ## ★ New printout software



- ★ Interfaces QL to standard modem
- ★ 300/300, 1200/75, 1200/1200
- ★ Autodials with DTR
- ★ Plugs into SER2
- ★ Terminated by 25 way D
- ★ Includes Viewdata software
- ★ Includes 80 column software

QL TRUMP CARD £199
768K RAM + DISC I/F



- ★ Increases QL memory to 896K
- ★ Standard 3½/5¼ inch disc i/f
- ★ Screen Dump
- ★ RAM Disc
- ★ Printer Buffer
- ★ Memory Cut
- ★ Toolkit II
- ★ £50 Expanderam trade-in
- ★ FREE 'T' shirt

QL QUADRAPRINT £19.50

- ★ 4 QL's to 1 printer
- ★ 5 metre cable £7.50
- ★ 10 metre cable £12.50
- ★ 20 metre cable £19.50

QL SERIAL CABLE £7.50

- ★ 25 way D plug
- ★ 3 metre cable

QL
JOYSTICK ADAPTOR £4.99

- ### ★ Atari/Commodore J/S to QL

**TRUMP CARD Plus twin
720K 3½" Disc drive £349
inclusive**

Tel: (0454) 317772

Orders welcome by telephone or post

MIRACLE SYSTEMS LTD., Northavon Business Centre, Dean Road, Yate, BRISTOL, BS17 5NH, U.K.
West German distributor: Jeposoft KRUPPSTR9, 4040 Weuss 21, Tel: 021078184

Please send me

Please find cheque enclosed to the value of £.....

☐ or debit my credit card

Expiry date		/	
-------------	--	---	--

Signature

Send to: Name

Address

. SQLW1

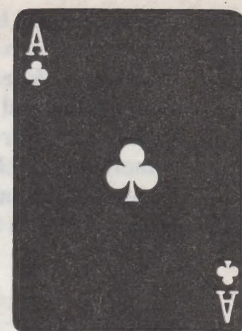
MIRACLE SYSTEMS LTD., Northavon Business Centre, Dean Road, Yate, BRISTOL, BS17 5NH, U.K.



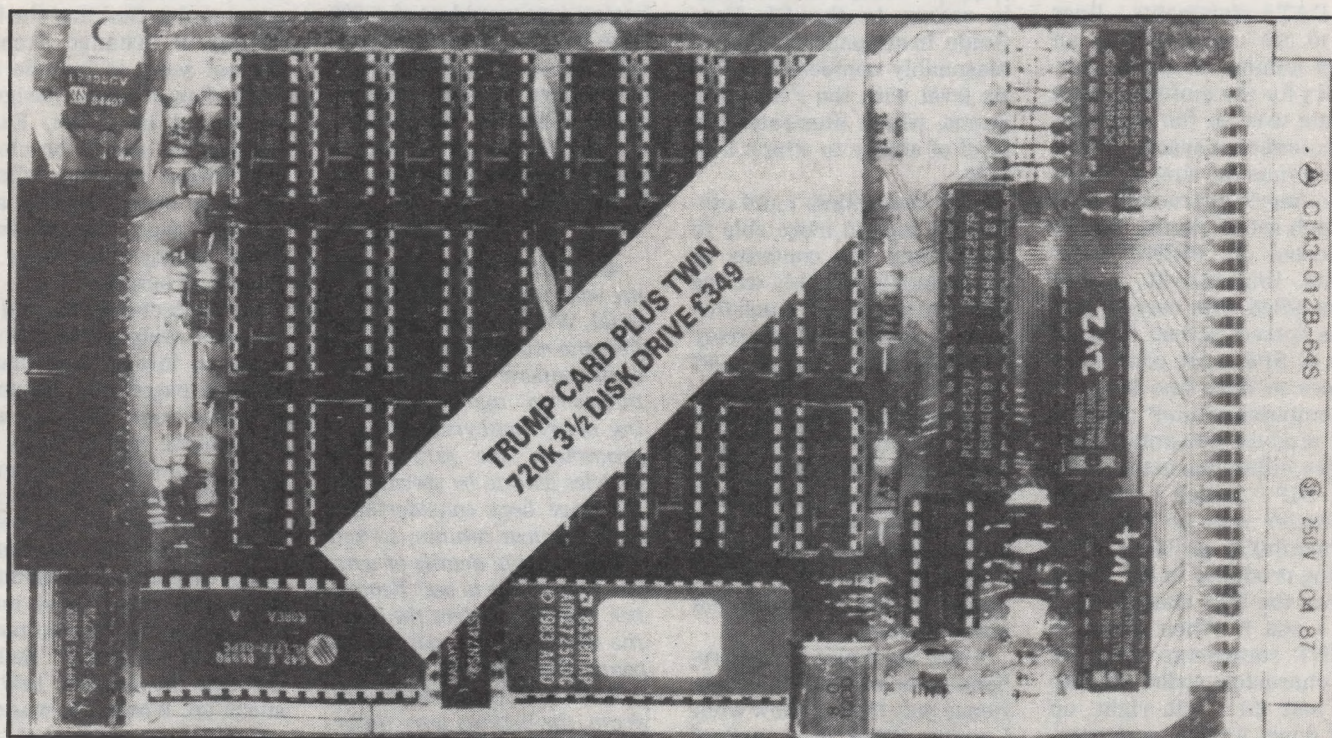
MIRACLE SYSTEMS

Tel. (0454) 317772

TRUMP CARD



- 768K RAM making 896K total
- Disc Interface
- RAM Disc
- Printer Buffer
- Toolkit II
- Screen Dump
- Memory Cut



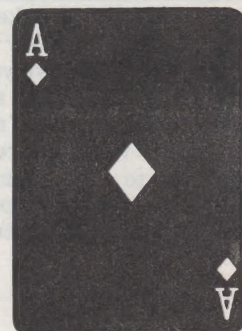
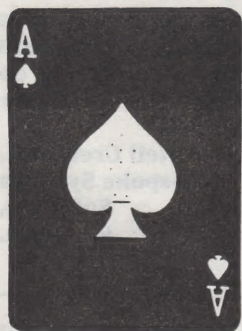
(THE TRUMP CARD IS SUPPLIED COMPLETE WITH COVER)

Price £199.00 inclusive

MIRACLE SYSTEMS LTD., NORTHAVON BUSINESS CENTRE, DEAN ROAD, YATE, BRISTOL, BS17 5NH, U.K.

Plug in the TRUMP CARD and you have a QL expanded to its maximum of **896K**. Its Disc Interface is fully compatible with QDOS, Psion packages, Superbasic, etc., To make maximum use of the **896K** the ROM software includes both static and dynamic RAM discs and a Serial Port printer buffer. The Screen Dump enables the screen to be copied to a dot matrix printer. Memory Cut lets programs that used to run only on an unexpanded QL run with the TRUMP CARD. And Tony Tebby's Toolkit II provides a comprehensive range of Basic extensions.

If you order directly from us then you not only get the 12 month warranty but a 14 day money back guarantee as well. We are also giving away a **FREE MIRACLE SYSTEMS 'T' shirt** with every retail order! For those of you who already have an EXPANDERAM 512K don't despair — we will also give you £50 trade in for it against a TRUMP CARD. So for peace of mind and a 'T' shirt, order direct from us by phone, quoting your ACCESS/VISA number or by post with a cheque, etc. **WE LOOK FORWARD TO HEARING FROM YOU.**



Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

OPEN

Gigo

I would like to warn anybody who tries to type in the *QL Convertor-Calculator* program October, 1987. It can be difficult to determine from listings the validity of certain characters and the exact number of spaces in some statements, which can make all the difference to whether or not a program runs.

In this instance, some of the DATA statements – lines 152 to 162 – must contain an exact number of spaces, necessary for the multiple string slicing used in the program. The number of spaces needed is 12 minus the sum of the alphanumeric characters within each set of quotes. Spaces indicated in PRINT statements – lines 12 to 31 – should be handled with care to produce correct screen data. In line 6, SP\$ must contain 15 spaces, as must line 50.

Computer/printer listings can produce unwanted characters, either due to the printer DIP switch settings, character sets or other incompatibility problems. The listing produced in *QL World* shows the four characters «, =, » and ?. When found in PRINT statements they are the characters coded 188, 189, 190 and 191 – left, right, up and down arrows on-screen. To get them you will have to use the CTRL key. See the character set codes in the QL manual for more information.

E Bamber, Glasgow.

What could they mean?

Having taken *QL World* for more than two years, I am at last moved to make a plea for those who are relative novices to the computer world and to mention the comprehension problems we

have until we can develop our individual education in this sphere.

I bought my *QL et al* in September, 1985 and have since been a self-taught student of the art. I have, led mainly by good advice gleaned from *QL World*, bought a dozen of the excellent Bradbeer, Glentop and Blueprint books and have joined the Eidersoft Support Service. They have proved invaluable; as a consequence I may even be ready to return to the QL User Guide. In summary, I am now reasonably competent at basic level with the Psion programs, which illustrates the level of ability to which I alude.

I feel that unless I and others like me am more able to understand the contents of my favourite monthly we are unlikely to proceed much further. I understood scarcely anything in the August, 1987 issue.

I appreciate that you must cater for the majority but could not some section be introduced which could lead and encourage the less knowledgeable? The main difficulty, I believe, is in the necessary use of jargon and abbreviations.

A few examples of comprehension blocks which I experience may help to show what I mean. What is a toolkit? They are constantly being written about and I have no clue what they do. Similarly, what is a compiler, and Editor? Nobody explains this to the novice. What are the programs which are written about in Utility File? The technical man may understand why one might buy QL Turbo+Quill or QLOAD but I cannot.

Turning to pages 50 and 51 of the August, 1987 issue, Watch the saves and Avoid horrible risks. The language seems simple, the articles helpful enough, but what was

the problem and what are the additional translate facilities mentioned in the second piece? Finally, on page 56 Mail Merge which/what are listings one, two and three?

I hope you take my observations seriously as I wish to be able to glean assistance and valuable advice from your pages but truly find a technological barrier. I do not think it would be fair to suggest that the technical articles should be reduced to basics; you would need a 200 page booklet each month and would lose many disenchanted readers. I would suggest either editorial clarification or a section each month which would seek to edify the uninitiated.

J H Witherow.

● *Editor's Reply: I appreciate your problem. The content of QL World is designed to reflect the market and the wishes of readers. Being a rather introverted market containing many hobbyists and programmers, the jargon and articles tend to be specialised. We have been considering a less technical column, so how about sending details of what you would like to see? Remember, the more letters the better the chance of the column appearing in the form you want.*

As to the Mail Merge program, the listings were unfortunately not labelled as they should have been. Listing one is the Mail Merge program. It is followed by listing two, the Labeller, starting at line 100 at the bottom of page 56. Finally, the example listing three starts at line 1 in the second column on page 57.

Lack of design

About one year ago we bought Xchange to run on IBM PCs. We had previously been using the Psion programs supplied with the QL

and had decided to take advantage of the additional facilities provided by the complete PC version. It was also hoped that the large number of PC users would provide us with a greater number of prospective clients who would be looking for specialist or tailored systems which we could develop using Archive, among other options.

Happily for us that proved to be the case but we were disappointed to find that the full version of Xchange Archive did not seem to include the printed page forms designer advertised by Psion. Exact wording in users' brochure was "Form Designer allows users to design screen and printed page; format comprises background form for input and output".

We contacted Psion and received a reply stating: "I am sorry to inform you that a 'printed pageforms designer' does not exist. The only way to generate reports is by using the LPRINT command". The fact that this facility did not exist proved annoying but it was possible to continue developing report modules using the slower and more awkward LPRINT command.

I have recently flicked through the August, 1987 issue of *QL World* and was disconcerted to find that the misrepresentation initiated by Psion in 1984 is still in evidence. The advertisement on page 39 states, regarding Xchange Archive "...multifile indices provide fast access and a form designer for screen and printed input and output".

I would be interested to hear of readers' comments regarding this or similar occurrences within the micro-computer field.

Neil Cresswell,
Bespoke Systems
Software,
Rainham.

CHANNEL

Impressive

I have owned a QL for around six months. I bought mine when Dixons was selling them for less than £100. Mine cost £70 because of the absence of a manual and I must admit to being most impressed with the system as a whole.

As a lecturer in computer studies, I spend a great deal of time with the more run-of-the-mill business systems like IBM and, believe me, they do not come much more run-of-the-mill than the PC. My business system is about the best of the bunch for that era of the PC in terms of enhanced features and is the ACT Sirius 1. Why industry has stayed with the old, outdated IBM concept so long is an historical rather than logical matter and goes some way towards explaining the QL's lack of success.

I read an interview wherein Sir Clive Sinclair was questioned about the QL's comparative failure. His excuse that the QL was too much too soon struck me as being both patronising and largely incorrect. Certainly it was not sufficient reason for Sinclair to go back to the ancient Z-80 running the even more ancient CPM, lap-top or not.

The QL never had a chance of repeating the success of the Spectrum. I believe that Sinclair misjudged the market badly. He must have reasoned that the mass market, having been exposed to the wonders of computing, was ready to do something sensible with the power rather than continue zapping the same old aliens in admittedly varied formats.

Had he looked carefully at the business market he would have seen that even business systems had then, and have now, the same kind

of juvenile software available. As a scientist and innovator the man is a genius; as a marketing man he did not appear to be in Alan Sugar's class.

I have yet to see the equal of the QL as a design concept. As a usable tool it shares a similar problem to the Spectrum and ZX machines – poor keyboard – but the goods inside the machine are far from poor. As a newcomer to the QL I can appreciate its merits by comparing it to the new designs. Qdos makes MS-DOS and CPM look decidedly dated.

I still marvel at the computer press making so much of the Sinclair decision to use 8-bit RAM for a 16-bit processor. The reviews were probably written on a machine which had been using the same design concept for some time with no adverse reaction – the IBM PC. The furious press condemnation of the Microdrives as unworkable reminded me so much of the adversity which has beset all scientists since they committed heresy by declaring the world to be round.

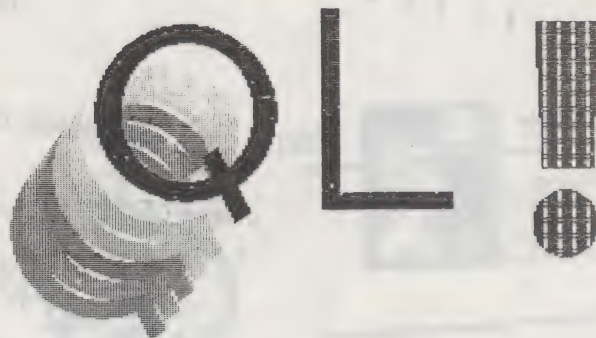
John Masterman,
Hartlepool

U.S. Viewpoint

I am a subscriber through a dealer/agent, Sharp's Inc of Mechanicsville, VA, U.S.A. I wanted to commend you on the magazine, its content and quality. As you may know, the U.S. version of the QL had just reached our shores and completed FCC tests to be marketed when Sinclair sold to Amstrad. A + Computer Response in New Hampshire acquired all the stocks and has been selling them through a limited group of mail order dealers.

The only national QL exposure, except for Timex-Sinclair User Group newsletters, has been in some one-man -

LONG LIVE THE



produced magazines. They include *Time Designs* magazine, *Quantum Levels*, *CTM* – formerly *Computer Trader Magazine* – and two others. With the possible exception of *CTM*, none would be found on a news stand. As you may have gathered *QL World* and the *Quanta User Group* magazine are both very welcome in the U.S. for famished QL owners.

Keep up the good work and do not stop publishing programs listings to type in, as this is the only way to learn SuperBasic by example.

Bob Howard, U.S.A.

Paper policy

I was surprised to read in the August, 1987 issue of *QL World* that you were advising QL users seeking thermal paper for the Serial 8056 printer to try Dixons. recently I visited various branches of Dixons in Manchester and Wigan in my quest for paper. The reply at all branches that they were out of stock and were unlikely to re-stock.

The sales staff displayed a generally disinterested attitude and did not seem perturbed by the fact that a printer without paper is not much use. I was somewhat perplexed by this in view of

your advice. Perhaps Dixons has different regional stock ordering policies?

I am finding thermal paper very difficult to obtain in this part of the country and have tried most of the major department and electrical stores in Manchester, Blackpool, Wigan and Bolton areas. My usual source of supply is Boots the Chemists but it is presently out of stock in this area. The larger branches have until recently stocked Brother thermal paper in both roll and pre-cut A4 sizes.

A4 roll is slightly too narrow for the 8056 but can be adapted by the simple means of cutting the ends of the central spindle of a used roll and glueing them to the ends of the central spindle of the new roll. Once the paper has been adapted to fit the printer there seem to be no problems when using the narrower A4 size with Quill, Abacus and Archive.

The quality of the 8056 varies greatly, depending on the quality of paper used. The Brother paper is the best I have found. Dixons paper does not tend to do justice to the printer, the quality and sharpness of the type being highly erratic and occasionally no print appears at all.

Gareth Boote, Wigan.

FILE DUMP ASCII/HEX



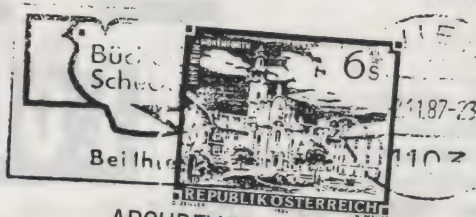
COMPARE



PDQ-XREF



SUPERBASIC PROGRAM MONITOR



ARCHDEV/RTM

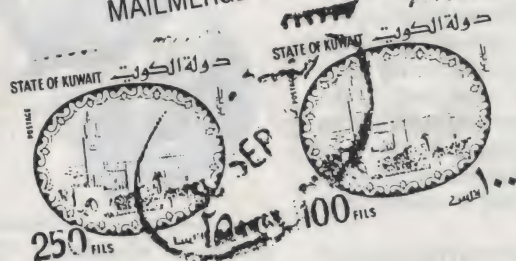
PDQ-COPY

Pass
Post

SEDIT



MAILMERGE de LUXE

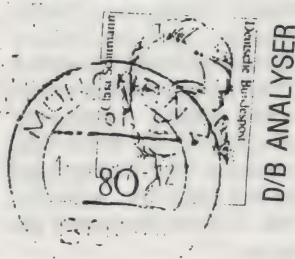
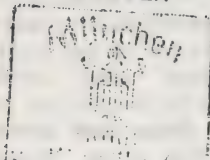


ARCHIVE TUTOR



FILEBOUND

RECOVER



D/B ANALYSER



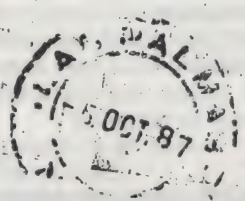
SCREENPRINT

CASH TRADER

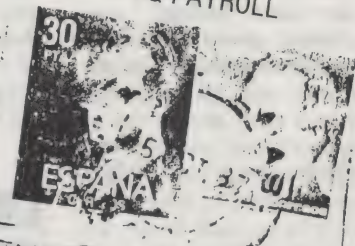
NAME & ADDRESS



graFix



PDQ-PAYROLL



PRINTER INSTALLER

CONFIGURATOR



BESPOKE SYSTEMS



LAZARUS



CT ANALYSER



FROM THE 1987 COLLECTION OF P.D.Q.L.

PDQL

Computer
Systems
and
Software

UNIT 1
HEATON HOUSE
CAMDEN STREET
BIRMINGHAM B1 3BZ

MAKE THE MOST OF YOUR QL AND THOR
for home or business use—Order from list or write for current catalogue. Prices include VAT and postage within the UK. Cheques with orders to, and full descriptive list available from, PDQL. Please state details of toolkit, extended memory and/or disc



**NOTE NEW
TELEPHONE
NUMBER
021-200 2313**

YOUR PROBLEMS ARE OUR CONCERN

CASH TRADER UPGRADE

The latest version of this Classic Program has been completely rebuilt and TURBO-charged needs no key-in boot cartridge — very fast and bug free — improved Save option; new Restore procedure — new CONFIGURATION program to allow many more Group and Analysis heads or documents; change the number of lines; baud rate; change to disc, RAM, Winchester etc.; have data on the System Disc — many other new features.

CASH TRADER UPGRADE provides a complete business Accounting routine — you don't have to be a Cash Trader to enjoy its benefits. Our UPGRADE customers include Accountants, Architects, Charities, Farmers, Shopkeepers, Engineers, Motor Showrooms and Repairers, Consultants, Doctors and many others. Sinclair QL World said (June 1987) "Configuration routine a new and welcome feature ... Day to day operation is simple ... PDQL ... have done a good job on CASH TRADER ... the main objections to the old version have been overcome."

CASH TRADER UPGRADE New users £80
Existing users send original CT Boot with order £39
CASH TRADER SUPPORT SCHEME (per annum) £15

C T ANALYSER

This new program compatible with CASH TRADER UPGRADE, versions 2.00 and later, provides the means to obtain a complete analysis of your CT data files and is capable of producing a nominal ledger £25

PDQ PAYROLL

A straightforward and easy to use answer to the problems of preparing salary and wages calculations — fully comprehensive it deals with monthly, weekly, and hourly paid staff — All deductions, bonuses, expenses dealt with — full reports to screen or any printer of Payslips, Employee record, analysis, deductions, cheques, cheque list, SSP, N1 or Company Pensions, P60/14, P35 — Save and Restore routines — re-configurable. Sinclair QL World said (June 1987): "... payrolls run in a fraction of the previous time ... a very attractive program ... reliable and fast."

PDQ PAYROLL £70
Annual SUPPORT SCHEME £15

DOMINATION

"Quirky," said Sinclair QL World; addictive say DOMINATION players. A Christmas or all-the-year-round game for the family or for the computer buff weary after a heavy day; played by 2-4 players any or all of whom can be human/the computer £9

MANY OTHER

General Utility, Archive Utility and Application Systems. NEW systems or adjustments to existing systems built to order. All PDQL SuperBASIC programs are TURBOcharged. All PDQL built programs are THOR compatible.

HARDWARE

All hardware we sell is tested by us before delivery — ask for special terms for TRUMP CARD and NEC drives — 7% PDQL program voucher on hardware purchases. PLUS Unbranded 3.5 discs £20 for ten; Fuji MFDD £32.50 for 10; Fuji MD2DD 5.25 discs £22 for ten; disc cleaning kits £15.

SPELLBOUND — The wonder Spelling Checker for Quill or Editor £29.95
now you can check existing documents with FILEBOUND only from PDQL £35
FILEBOUND is available separately at £5 — send blank cartridge and stamped and addressed envelope with remittance.

'ARCHIVE TUTOR is about the best introduction to the database system ...' Sinclair QL World, February 1987.

ARCHIVE TUTOR teaches you all you want to know £21
'SCREEN FORMAT PRINTER will prove a powerful addition to your software library.' Sinclair QL World, February 1987.

SCREEN FORMAT PRINTER prints out your Archive Screen, Co-ordinates and Colours £7

THE EDITOR SPECIAL EDITION — (from DP) with NEW FEATURES — Whether you want to create/edit a SuperBASIC program (even if unlined), a text file or a Quill doc. EDITOR is the answer to the expanded QL maiden's prayer £49.95

'PDQ-XREF ... one of the most valuable development utilities I have seen ... an indispensable aid ... Sinclair QL World, April 1987.

PDQ-XREF provides a complete glossary for your SuperBASIC programs £15

'COMPARE is essential for anyone requiring information concerning his files.' Sinclair QL World, May 1987.

COMPARE compares two specified text files in separate windows ... mismatches highlighted ... easy re-alignment ... line numbers can be ignored £10

'SEDIT provides a means to create and edit screen format files in Archive ... a very useful utility and exceptionally good value.' Sinclair QL World, May 1987.

SEDIT the easy way to design your Archive screens £15

ARCHIVE DATABASE RECOVERY (Archive on the Mend) £20

LAZARUS the essential disc file Recovery program £20

PDQ NAME & ADDRESS comprehensive database system: Standard Archive £18
with Run Time Module for ArchDEV £36

MAILMERGE de LUXE the Prince of Mailmerge applications £14
ArchDEV/RTM (Psion) £20

ARCHIVE DATABASE ANALYSER — reports to screen, printer or file on the number and average size of records with detail of field usage — highlights redundant/overlength fields £7

SPEEDSCREEN. A utility dedicated to speeding up text and graphic output, scrolling, window/block clearing and cursor on/off functions £20

TROUBLE

Many users may have little idea of what is involved in dealing with letters and telephone calls. *QL World* has several regular features answering letters and the time spent is comparable with that required to assemble the magazine as a whole. For that reason it has been necessary to advise telephone callers that only letter enquiries can be entertained.

Only a selection of letters can be answered; where a letter highlights a problem which may interest many readers it is worth printing a response but an obscure enquiry is unlikely to be dealt with, in general. Remember that virtually all enquiries received should have been directed elsewhere in the first instance – the problems were not created by the magazine – but we do our best to answer queries on behalf of suppliers, software writers and hardware manufacturers. Excluding a SAE if a reply by letter is desired helps keep down costs and allows more enquiries to be dealt with.

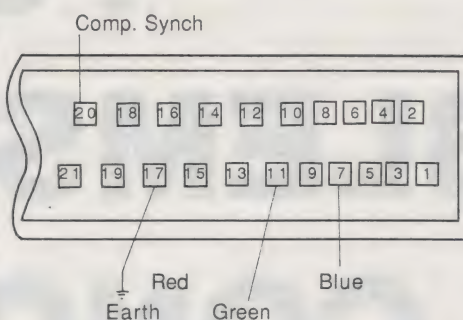
High prices

Have any overseas readers found that their local shops are charging high prices for software produced in the U.K.? The question was prompted by a call from a supplier who had been told that the price paid for a program at one shop in the Netherlands was about 70 percent higher than the U.K. price. A shop buying even small quantities from a supplier would get some discount and the shop in this case might have been marking up the price paid by about 100 percent.

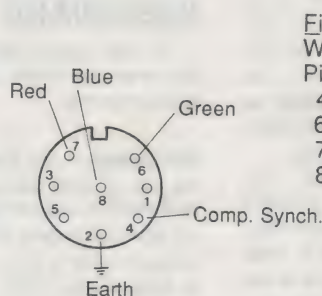
As the shop concerned had not ordered the program from the original supplier there is also the question of whether or not the copies being sold had been pirated, in which case the buyer might have difficulty in getting upgrades.

There has been an upgrade of the ROM in the Thor 1 to version 4.21, which allows programs using the Keyrow function to work. For those having version 4.10 ROM the same result can be obtained from a 4.21

Figure 1



Prism connector, seen from the outside



QL connector, seen from the outside

Figure 2
Wire colours:
Pin 2 Green
4 Yellow
6 Red
7 White
8 Purple

Figure 3

Connector pins (PCB wiring)	
BT	D
1	1
2	2
3	3
4	4
5	5
6	9

Equivalent connections for
SER1 port on Samsung
machines with "D"
connectors

systems disc. These items are obtainable from CST. There is no guarantee that all such programs will now work. **M. I. Jackman** reports being able to use *Sign Designer* now but is still having difficulty with *QL Peintre* and *GrahiQL*. Can **Pyramide** and **Talent** offer any suggestions?

Problems with the Thor should be addressed directly to CST but do not expect the company to deal with all

matters which concern just Eidersoft software. CST will be handling selling the Thor now for the most part; it sells through other suppliers but they are not the usual QL outlets.

Peter Tyler writes to say he has had six or seven once-used cartridges which have proved to be bad. Most were identified by a Psion version 1.0 program name. Cartridges made in the early days of the QL did not seem to meet the same quality standard as those made for version 2 software and it is no surprise to learn his comments. The lack of comment from other readers suggests there is no great difficulty with cartridges. Perhaps the price seems so low that a few rejects do not worry most people?

No-one has offered a circuit diagram yet for the Samsung Seri D connector and I have had to explore the serial port connections the hard way. Figure 3 shows a comparison between the BT and D sockets used on the QL PCB for the Seri port. As all the wires go to the same pin numbers, except for one. I had doubts about pin 6/9 but that was the way I found it on my machine.

Howard Clase of Newfoundland advises that he has found the wiring to pins 1-6 is the same for both BT and D, so be careful before making the one connection. The only difference of which I know between his QL and mine is that his is presumably a U.S. market version, whereas mine was made for Germany.

In case there are any users with two QLs networked with a printer attached to the slave, the way to print from Editor or Quill in QL1 is to alter the Print and Printer data files respectively and insert the relevant network designation of the QL with the printer attached to it, e.g., n2 Seri.

Both files can be altered easily after they have been read into Editor alternatively, Printer data can be altered by running the Install base routine and taking the non-standard port option, then inserting the network designation for the printer. Do not forget to key-in FSERVE on QL2 if you are using Toolkit II, I use TK2 in both machines but printing via the slave

SHOOTER

E M S O L V E D

may still be possible with just the basic QL network commands.

Any offers

R. Mueller of Pietersburg, South Africa asks for programming hints, perhaps programs for *QSound/Q-Print* Any offers?

There are occasionally references in readers' letters to cartridges becoming corrupted by magnetic fields encountered during the mailing process. It appears to me that the readers are usually making an incorrect assumption; it is more likely the corruption is due to bad copying of files in the first place, or to faulty Microdrives or actions of the user.

Mueller sent copies of letters received from both U.K. and S.A. post offices, following problems he had with cartridges received from the U.K. and the responses were somewhat different.

The S.A. office said that it was unaware of equipment used by it causing problems with recorded tapes or discs; the U.K. office stated that "erasure ... due to ... magnetic fields ... is not uncommon".

The U.K. office also stated that it is not aware of any equipment used by it, by airlines or Customs which would cause such damage. It advised sending cartridges "in a container designed specifically to shield its contents from strong magnetic fields". Cartridge and cassette manufacturers should be able to supply details of such containers.

In practice

When such items are despatched they should be identified as computer records or computer software. In practice, I cannot see suppliers going to the expense of using special packages, because buyers would not be keen to pay the extra cost, and because the proportion of cartridges returned due to suspected corruption by magnetic fields must be extremely low. It needs to be a fairly strong magnetic field to cause corruption but long-term exposure to a medium field e.g., leaving a cartridge close to a TV set or transformer, might cause trouble.

Chromagraphics. A reader has written providing the names and addresses of two people to whom he says complaints can be addressed. Anyone with an outstanding complaint against the company which they wish to pursue should send a SAE for details. The Chroma display is said to be basically a Microvitec unit.

Printerland. Details of this company, its position, and the address of a director have been sent to me. If you wish to pursue complaints with the company and require the information, please send me a SAE. We cannot vouch for the accuracy of the information but it seems reasonable.

Byteback. Another complaint has been received and no response has been received to any of the four complaints letters passed to the company. **W.D. Software** and **Xenon** have not responded to the single complaint letters sent to them, nor to reminders.

Eidersoft. The company has been split into two operations, one handling QL supplies, the other Atari and such. Do not contact Eidersoft Ltd on QL matters as the company is the one dealing with the Atari. The company for QL users is called **Eidersoft-QL**; the address and telephone number are given at the end. Inevitably, the change in management and personnel will mean that there may be delays in dealing with some matters and you are asked to be patient while the Eidersoft stock and administration is set up anew.

Good reputation

It is expected that most of the Eidersoft range of products will still be available. The people now handling this range have a good reputation for dealing with customers and they have been on the QL scene since the early days.

Microdeal reports having sent a replacement copy of *Land of Havoc* to **R. Mueller** in South Africa but is now sending another in case the first was lost on the way. It apologises to the customer for any inconvenience.

Disc drive repairs. If you send drive(s) to be repaired by **Akhter** it is

likely to be returned set up as Drive 0 regardless of what it was when you sent it for repair. It is apparently standard practice to set all movable jumpers to the positions specified in the manufacturer's test procedure. That cost **P. Edwards** about £60 as he tried to find a non-existent fault in his returned drive by first replacing the interface, then taking the drive to another repairer, who noticed the incorrect drive setting.

Prism QL14 Monitor. **W. Newell** obtained a suitable lead for connecting this display to the QL from **Care Electronics** for £10.35. The lead is called RGB 8-pin to SCART (Euro). The display worked correctly with this lead. The instructions with the Prism are apparently sketchy but if **M. H. Mottram** would like a copy, he should send a SAE to me, for forwarding to Newell.

D. Redpath, G. M. Young and A. V. Williams sent details of the connections required - see figures 1 and 2. Thanks to the readers for the help. Both sketches show the sockets which are attached to the devices, as viewed from outside. As there were differences between the drawings sent to me, further comments on the wiring would be welcome.

Wire colours

The colours given are for the screen display, not for the sheathing of the wire used. If you have a standard Sinclair cable with 8-pin plug at the QL end and bare wires at the other, use the relationships between wire colours and pins given in figure two. The Prism was apparently based on the Fidelity ZX3000 chassis.

Suppliers

Radiospares
PO Box 99
Corby
Northamptonshire NN17 9RS
Tel: 0536 201201
Eidersoft-QL
86 Commercial Road
Paddock Wood
Tonbridge
Kent
Tel: 089283 2552

FRONT EXTRA! PAGE 2

All the features of FPx, plus high-resolution fonts in sizes from 8x8 dots to a massive 64x56! Use the whole page - no screen restrictions! FULL 96 character ASCII sets! Fully redefinable! Save your own! Four sets supplied from 12x8 (like this one) to 32x32!

OFFICE JUNIOR

The new six-key wonder! (Most of it only uses the cursor keys, space, and enter) It is a set of utilities including the usual boring delete/format/copy options, PLUS -
JOIN AND SHRINK QUILL .doc FILES BY AN AVERAGE 35%! INVALUABLE FOR THOSE LONG SPACE-CONSUMING FILES!
CONVERT FULL-COLOUR MODE 8 SCREENS INTO SOMETHING USABLE WITH FPx2, B/U PRINTERS, EVEN DTP! etc,etc
It is fully compatible with the Smiling Software Mouse (which is compatible with FP, Quill, etc....)

WHERE ELSE COULD YOU GET AN
OFFICE JUNIOR FOR £20.00?

YOUR TIME IS VALUABLE, SO OUR SOFTWARE IS
EASY TO LEARN, EASY TO USE, AND EASY TO AFFORD!

PRICES

FRONT PAGE 1.05	£ 22.50	TASK SWOPPER	£ 19.95	QFLASH EPROM	£ 25.00
FRONT PAGE EXTRA/2	£ 39.95	TASKMASTER	£ 25.00	SCHON KEYBOARD	£ 54.00
OFFICE JUNIOR	£ 20.00	EYE-Q	£ 29.95	TRUMP CARD	£200.00
FP to FPx/2	£ 30.00	GRAM	£ 30.00	SMILING MOUSE	£ 40.00
FPx to FPx/2	£ 10.00	QLOAD/QREF	£ 10.00	10x3.5" (library box)	£ 20.00
FP to FP1.05	£ 4.00	SPELLBOUND	£ 29.95	40x3.5" (locking box)	£ 80.00
OFFICE JUNIOR+MOUSE	£ 60.00	QLIBERATOR	£ 60.00	3.5" library box (10)	£ 2.50
SIGN DESIGNER	£ 17.50	MDV cartridges (10)	£ 16.00	3.5" locking box (40)	£ 12.00

** RING FOR PRICES FOR PAPER, PRINTER RIBBONS, SCREEN CLEANER, LABELS, ETC. e.g. mdv labels £3/100

THE FRONT PAGE CLUB costs only £15 per year, and for that you get discounts on our range AND a free (though intermittent!) newsletter. All items produced by GAP carry discounts of 20%, and most of the rest gets 10%!

e.g. Trump card £180, Sign Des £15.75, Task Swopper £17.95, FPx/2 £32, etc

Ring for details, and start to save NOW!

See you on Stand 99 at
the Microfair 12th Dec

EXCLUSIVE DISTRIBUTOR IN USA:

SHARPS INC., RT 10, BOX 459, MECHANICSVILLE, VA 23111

EXCLUSIVE DISTRIBUTOR IN SWEDEN:

TN ELEKTRONIK, BOX 79, S-701 21 BORLANGE

DISTRIBUTOR IN U. GERMANY:

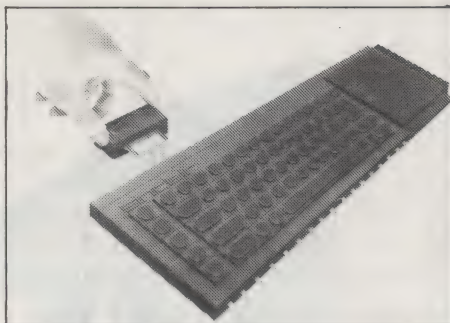
PHILGERMA, UNGERERSTRASSE 42, 8000 MUNICHEN 40

This advertisement was designed, and printed using Front Page Extra/2. Most of the character sets are available in the program as bought. The advert was printed using an HP165 printer. (Only £238 inc QL interface, VAT, ptp)

The Front Page series and Office Junior have been compiled using QLiberator by Liberation Software.

Thanks for the memory

Ron Massey looks at the differences between permanent and temporary computer memory



Although functionally similar, computer memory chips fall in either of two distinct categories, Random Access Memory and the Read Only Memory.

The names given to the chips are a misnomer, in that both can and usually are accessed randomly. From the users' point of view, the names are used to distinguish between temporary and permanent types of memory respectively.

From the computer point of view when it is looking at the internal data flow, a program can make RAM chips behave as if they were ROM chips. It is in this way that SuperBasic extensions are added by various toolkits as if they were part of the QL native language.

To keep power supply requirements to minimum the most common type of RAM chip used is called a Dynamic RAM. DRAMs require a refresh cycle, during which time its data contents are, in a manner of speaking, re-established.

There is one important difference between the two types of chip—data content of a ROM will remain constant, whether the computer is powered up or not, and it cannot be altered without specialised equipment.

The internal structure of a ROM is similar to a very complex matrix fuse-type board, in which, during programming, individual fuses are blown, or not, to represent a digital logic 1 or logic 0.

Programs held by ROM chips, such as the QL operating system, are blown on to the chip by a special ma-

chine and are not alterable subsequently. Because manufacturers of computers and their peripherals must order ROMs in large quantities, programs destined for ROMs must be completely bug-free. It is for that reason that special types of ROM chips are used.

While a program is being developed it is common practice to use any of several types of re-programmable ROM chip. The most common type, the Electrically Programmable ROM, has individual bits set by electronic pulses and is erasable by prolonged exposure to ultra-violet light.

Early QL

The operating system of the very early QLs was programmed on this type of chip. As the ROMs progressed through de-bugging and various version releases, they were burned on to permanent ROM chips.

To prevent possible confusion with reference to ROMs and EPROMs, references to either will be used in this report interchangeably. Although there is considerable difference between the two types of device from an electronic point of view, readers should appreciate that, functionally, they serve the same purpose.

A ROM slot, located at the rear of the QL, allows users to put additional ROMs on-line, as if they were part of the native operating system. Complete sub-systems such as *ICE*, *MICE*, EPROM-based monitors such as *ROMON* available from TK Computerware, a number of useful toolkits, such as the QL jump *Super Toolkit II*, Sandy *CPMulator* and a

host of other add-ons can occupy this slot.

Each time the QL is re-set, it checks for ROM drivers. The availability of add-on ROMs is identified by the long-word flag 4AFB0001. If the flag is set the QL will link in the additional procedures from the ROM of the operating system. Allocated address space at 49152 to 65536 (decimal), or 0C000 to 10000 (hexadecimal), provides 16K of additional "permanent" program area from which programs usually are initialised by keywords.

Virtually every EPROM-based QL add-on available is supplied in EPROM cartridges produced by Care Electronics.

A compact and unobtrusive black box, connection to the QL is made through part of the cartridge printed circuit board which protrudes through the cartridge front edge. Fourteen tracks on each side of the PCB transfer the data to the QL.

In spite of being the most advanced home and small business micro at the time, the QL suffers a failing common with products built to a price the sockets used to connect the QL to the outside world will not withstand wear.

It is a sad fact that ROM and expansion port sockets are particularly prone to becoming unreliable if devices are changed frequently. Another problem the QL enthusiast often finds is that, with the wealth of EPROM-based programs available, frequent changes have become almost mandatory.

Taking the problem of premature failure of the QL connectors seriously, a number of solutions have been found.

One of the first adaptors providing the option of having a range of on-line EPROMs without the necessity of frequent component exchanges, the German-based company Ultrasoft produced its Multi-EPROM adaptor which is connected to the QL in the same way as the conventional Care cartridge.

The Multi-EPROM printed circuit board includes provision for installing one to six EPROM chips removed from Care cartridges. When installed, its 160mm. x 80mm. box is positioned vertically at the rear of the QL. A row of seven switches, each with an associated LED, puts selected EPROMs on-line. If a different ROM is selected the QL must be re-set, as putting a new ROM into the system mid-stream, so to speak, will always cause a system crash.

A principal weakness inherent in the design of the version of Multi-

EPROM reviewed is that its PCB connector is positioned near the right-hand side of the front face of the adaptor.

Overcoming the two problem areas of the Ultrasoft Multi-EPROM and, at the same time, adding a useful sub-system to the QL, Micro Control Systems has produced a multiple EPROM synthesiser, Multi-ROM, which uses RAM instead of ROM chips for portable storage of program data. Installing Multi-ROM requires the connection of a wire link inside the QL between the B7 terminal, in the expansion plug – the seventh pin from the front of the QL on the top row – to the right-hand terminal on the bottom row of the ROM socket. As the link is terminated at each end with miniature multimeter-type connectors, no soldering is required.

Once installed, the link provides a write-enable function enabling the

Thanks for the memory CONTINUED

QL to download data into the Multi-ROM memory; the link has no effect on standard EPROMs. The QL case is then re-assembled and the final phase of preparation, prior to Multi-ROM installation in the ROM port, can be made.

The data held on standard EPROMs must be transferred to individual files on Microdrive or disc. This is done by switching off the QL, inserting each standard EPROM – i.e., as supplied in Care or equivalent cartridges – switching on the QL and, after pressing «F1» or «F2», typing:

SBYTES drive-filename,49152,16384

If the ROM image is different from the Multi-ROM current contents, the QL will perform a system software re-set automatically with the new keyword "WARMSTART". If the contents are the same, return to SuperBasic is made.

Several methods have been provided to enable you to perform a system re-set. A "warm-key" function converts the otherwise fatal «CTRL»«ALT»«7» key combination into a keyboard version of the Multi-ROM SuperBasic extension "WARM-START". Either method will re-set the QL, by-passing the usual memory check.

The SuperBasic extension "RE-SET" performs the same function as pressing the QL re-set button; "WARM128" will re-set an expanded

QL to 128K memory. An additional facility has been provided to allow users to run EPROM-based programs from memory; "RUN-FROM" allows you to load and initialise formerly EPROM-based utilities from a drive. A typical application of this function:

100 LOAD-FROM flp1-Toolkit-II

110 RUN-FROM flp1-qflash

120 RUN-FROM flp1-ProPascal

will load Toolkit II into Multi-ROM and re-boot. It will then load and initialise the Qflash RAM and ProPascal. Some position-dependent programs will not work with the "RUN-FROM" command because they expect to run at address C000.

Two programs known to fall within this limitation are Eidersoft ICE and the Metacomco C compiler, both of which will, however, run normally when used with the "LOAD-FROM" facility.

Also included in the Multi-ROM repertoire is a utility to provide a default device driver, enabling you to enter directives and filenames with

minimal typing. As a safeguard, the DELETE and FORMAT commands require a specified drive but a specified default drive may be used with LOAD, LRUN, EXEC, SEXEC, LBYTES, SAVE, SBYTES, COPY, DIR, OPEN and the Multi-ROM extensions LOAD-FROM and RUN-FROM. Other device-related extensions have been provided to make life a little easier:

DEVLIST [channel] lists all the devices recognised by Multi-ROM.

ADD-NAME name adds a new recognised device to the list of devices.

DEFAULT device name allows the default device to be changed.

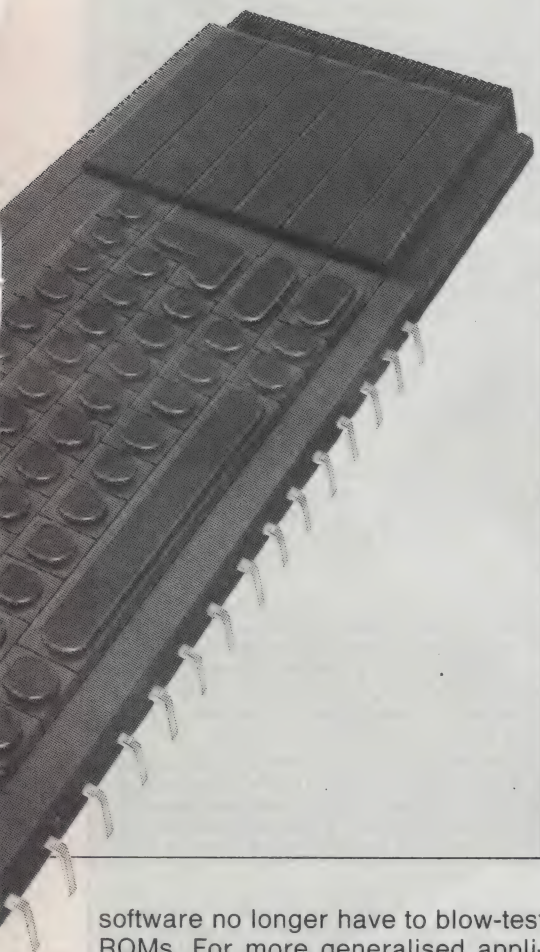
defdev\$ is a function to return the current default setting.

EXIST is a function which may be used to test if a specified file exists.

Obviously, Multi-ROM provides a number of useful facilities. What may not be so readily apparent is that programmers developing ROM-based

**"Anyone doing
serious work with
EPROMs will
almost inevitably
eventually acquire
an EPROM
programmer"**





software no longer have to blow-test ROMs. For more generalised applications, Multi-ROM provides an easy-to-use system which will, if you take advantage of the range of genuinely-useful EPROM-based software available, save considerable wear and tear on the ROM socket by eliminating the need to change EPROM cartridges constantly.

The release version of the Qflash Chip Board reflects a considerable degree of design sophistication. If you have either a standard 128K QL or internal memory expansion two Chip Boards may be connected in series through the expansion port on the left side of the QL, giving you the maximum total of additional ROM space of 256K.

If you have external memory expansion and/or a disc interface, your QL will accommodate only a single Chip Board. Your disc interface is removed from the QL, Chip Board is plugged into the expansion port and the interface is connected to the through-plug on the end of the Chip

Board.

As supplied, Chip Board is configured to accommodate three 16K user-supplied EPROMs. Users have the option of having three 64K EPROMs instead but doing so requires that the master program to be blown on to EPROM must be sent to Qflash for a modification of the file header, identifying that it is an EPROM-based program.

Anyone doing serious work with EPROMs will almost inevitably eventually acquire an EPROM programmer. Even if you have had no previous experience with a programmer, you will find QEP III exceptionally easy to use. Every attention has been paid to the smallest detail with regard to both presentation and function. Shipped in an A5 case, accommodating both operation manual and the programmer unit, QEP III is held in position to the lid by a strip of Velcro. Occupying the QL expansion port, QEP III remains resident and may be invoked with either:

EPROM or EPROM size

where size is the working area to be used by QEP III. Defaulting to 64K, working area may be altered in increments of 1K.

Complete range

This versatile and flexible programmer is suitable for the complete range of 5-volt MOS and CMOS EPROMs from 16K – 2716/2516 types – to 512K – 27512 type. Three programming voltages are provided – 12.7, 21 or 25 volts.

Protruding from the left end of the programmer, a 28-pin Zero Insertion Force socket accommodates an EPROM – either a programmed chip, which is to be copied into the QL memory, or a new chip ready to be programmed.

A two-position lever on the ZIF socket, in the "Free" position, enables a chip to be dropped into place. Moving the lever to the "Lock" position clamps the pins with the unit contacts.

In addition to selecting the type of EPROM, pinout details may also be changed, allowing you to diverge from standard pinout allocations for address and data lines. Particularly useful, this feature allows PCB layouts to be simplified by allowing PCB tracks to be laid out as convenient rather than having to adhere to chip manufacturers' standard pinout conventions. EPROM-type and re-defined pinout configurations can be saved as a file to Microdrive and may be re-loaded as required. The QEP

Illuser interface consists of a combined menu and command system. Options are selected either by using the cursor keys to highlight the required item and pressing either «SPACE» or «ENTER» or by pressing the first character of the item. Throughout, pressing «ESC» will abandon a selected option.

Programming may be made at all locations in an EPROM or within a defined address range.

Prior consideration

As with all computer peripherals, prospective purchasers should give careful consideration regarding their requirements prior to buying add-ons; functional compatibility with existing peripherals is important.

Typical of the consideration being referred to, to provide the user with the maximum memory expansion of 896K the Miracle Trump Card utilises the chip address from E0000 to FFFFFF, allocated originally for additional ROMs, as RAM memory.

Trump Card users withing to have on-line EPROMs should consider either single EPROMs, of the Care cartridge type, the MCS Multi-Rom or the Ultrasoft Multi-EPROM adaptor as an alternative to the Qflash Chip Board. Users with either standard 128K or up to 640K expanded systems can opt to use any of the multiple add-on systems available.

It is my feeling that the ideal arrangement for Chip Board would be with a solely Microdrive-based machine, used with internal memory expansion. That is not to say that disc interfaces/external memory cannot be used but Chip Board precludes the use of the rear extension legs supplied with the QL.

You must also take precautions to ensure that the connection of your interface will remain integral to the QL while it is powered-up; failure to do so could result in damage to the electronic components of the interface, the QL or both.

A slightly less important consideration, displacement of the disc interface card by 70mm. required by the Chip Board width will expose most of the components of your interface. In my estimation, from the point of view of ease of use, presentation and its cost-effectiveness, QEP III must receive top marks.

This deceptively unassuming tool is the finest EPROM programmer I have used. there can be little doubt that QEP III represents the epitome of state-of-the-art EPROM programmers.



CAMBRIDGE SYSTEMS TECHNOLOGY

24 Green Street, Stevenage, Herts SG1 3DS
Telephone: Stevenage (0438) 352150



THOR

THOR 20

THOR 21

NEW

MONITORS

QDisc Interface

RAM Plus

The Thor Computer System is a professional business machine designed with the user and his future requirements in mind. Cambridge Systems Technology have developed several models making the Thor extremely versatile: the single NEC 3.5in. floppy version with or without a 20M SCSI Winchester in addition to the dual floppy model packaged in a stylish metal case. The Thor is equipped with 640K RAM, parallel and serial printer ports, battery-backed clock and a separate IBM style (PC-AT) keyboard. Supplied free with the Thor is a specially commissioned version of the award winning Psion Xchange(*) software suite and a comprehensive manual. Special features of the Thor include multitasking at a single key-stroke and enhanced screen windowing representing excellent value for money.

The Thor 20 Computer System is the newest development from Cambridge Systems Technology, the very latest in high-speed processing. Based on the Motorola MC68020 processor, the Thor 20 delivers on average three times the computing power of the Thor.

The Thor 20 package includes a suite of development software comprising a specially commissioned macro assembler by Talent Computer Systems and a linker by GST in addition to the Psion Xchange* business software together with full supporting documentation. The Thor 20 Computer System provides a substantially higher performance than the Thor at a very cost-effective price.

The Thor 21 Computer System is designed for 'number crunching' applications. Based on the 68020 processor and additionally incorporating the MC68881 floating point coprocessor, the performance of floating point operations are dramatically improved - taking only 1% of the time taken without the coprocessor. This system is essential for a wide range of scientific and engineering applications and only costs an additional £201.25 (inc VAT).

CST now offer a choice of monochrome or colour monitor suitable for use with the Thor range of computers. The Philips CM8833 14" colour monitor includes interface lead and screen. The Philips 7502 12" monitor has a dark anti-glare screen, horizontal/vertical size adjustment, position adjustment, brightness and contrast adjustment and a foldable foot. Both of these monitors have been selected by CST from the wide array of available monitors for their superior performance and reliability when used with the Thor computer range.

The best-selling floppy disk interface is fitted with a 16K EPROM containing many 'Toolkit' extensions, and CST's Ram Drive 2. It may be used with most 3.5 or 5.25 floppy disc drives. CST's own twin slimline double sided 80 track 3.5 units being exceptional value for money, with 720K of formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands and functions designed to improve access to the powerful facilities of the QL without the need for machine-code programming. Job control is made easier, files can be used for random access, alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3.5in. and 5.25in. floppy disc.

The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grade 256K memory devices, this unit is the only one which offers the high performance of no wait-state operation. Housed in a rugged metal case, the RAM-plus unit has an expansion slot which duplicates the QL's, allowing any other CST peripheral to be used. Among the advantages derived from using the RAM-plus are the performance improvements of software and storage devices, and the ability to multitask several programs at once.

* Xchange is a Trade Mark of Psion Ltd.

Please supply:-

	UK inc VAT	Overseas
Qdisc Interface 4 (3.5in. util. disc)	£79.95	£72.70
Qdisc Interface 4 (5.25in. util. disc)	£79.95	£72.80
QEP-III Eprom programmer (QL/THOR)	£129.95	£116.00
RAM-plus 512K QL memory	£139.95	£125.20
CST Dual 3.5in. cased floppy discs	£219.95	£200.40
CST Q-488 GPIB instrument interface	£224.25	£198.40
CST QDISC SCSI interface	£230.00	£203.40
Qdisc 4 + dual 3.5in. drives	£275.00	£249.40
Qdisc 4, RAM-plus + dual 3.5in. discs	£405.00	£363.60
3.5in. Utility disc inc. Ram Drive 2	£10.00	£10.00
5.25in. Utility disc inc. Ram Drive 2	£10.00	£10.00
Eprom V1.16 for issue 2/3 Qdisc	£15.00	£15.00
Eprom V1.19 for issue 4 Qdisc	£15.00	£15.00
Thor 1F (Single floppy)	£688.85	£650.00
Thor FF (Dual floppy)	£803.85	£750.00
Thor WF (Winchester + floppy)	£1608.85	£1450.00
Thor 20 1F (Single floppy)	£1292.60	£1179.00
Thor 20 FF (Dual floppy)	£1407.60	£1279.00
Thor 20 WF (Winchester + floppy)	£2212.60	£1979.00
Thor 21 1F (Single floppy)	£1493	£1354.00
Thor 21 FF (Dual Floppy)	£1608.85	£1454.00
Thor 21 WF (Winchester + Floppy)	£2413.85	£2154.00
Thor User Guide	£20.00	£23.00
MC68020 User's Manual	£20.00	£23.00
MC68881 User's Manual	£20.00	£23.00
Talent 68020/68881 Assembler	£34.50	£33.00
*refundable on purchase of appropriate Thor For the Thor Range.		
Philips Monitor (Monochrome)	£92.95	£111.40
Philips Monitor (Colour)	£295.00	£300.40
Beige Mouse	£74.75	£72.00
Psion Chess	£24.95	£22.70
Additional 12m Service contract (1F&FF)	£85.25	
Additional 12m Service contract (WF)	£115.00	

QL Trade-in against Thor
Deduct £70 (UK) £60 (O/S) ☐

Export administration
Airmail outside Europe

£5.00 ☐
£10.00 ☐

Please complete in full

Name

Address

Post Code Telephone

I enclose a cheque/PO of £

Please deduct my Access/Mastercard/Eurocard/Diners Club/Vector a/c

Card No.

Expiry Date

Signature



Prices are inclusive of carriage
CST reserve the right to alter prices and specifications without prior notice



Thor XVI Thunders Ahead

THE DEVELOPMENT team at CST are pulling out all the stops to have their XVI series ready for the new year and firm orders are already building up, adding to the pressure. The ever cautious Manufacturing Manager, Graham Priestley said: "With the hardware manufacture now entirely in-house and to our own designs, we have a much tighter grip on quality control and assurance."

"Our use of advanced but established components means maximum reliability without sacrificing performance or security of future supply."

He said that CST's main aim is to ensure that the Thor XVI is as flexible as possible. This theme was stressed at the recent QUANTA meeting in Swindon by Dansoft's Hellmuth Stuten and CST's Proprietor, David Oliver, where the design of the Thor XVI was discussed with club members.

Planned Obsolescence

Many of the questions raised were on the often thorny subject of compatability with existing and future products. Oliver explained that company philosophy is to support existing and new customers into the future with planned growth rather than the planned obsolescence adopted by many of the high volume manufacturers.

Examples given were the continuing use of the Qdos architecture (albeit vastly enhanced), compatible hardware interfaces and continuously expandable systems: for example, a user with a humble single floppy 512K machine can upgrade in stages to a 6.5 Mb system with a winchester and two floppies and remain in the knowledge that he will be able to incorporate new features as they become available.

Prospero Deal Agreed

RENOWNED software house prospero have reached agreement with CST to port their Pro-Pascal and Pro-Fortran 77 compilers onto the Thor computer range.

Due for release early in the new year, the new versions are fully validated implementations of these popular languages.

Protected

To maximise ease-of-use while guarding against "piracy", the compilers make use of the Thor's unique Watermark protection system to customise each copy to one machine without needing a "master" disc or rom to be present.

Dear Hilde . . . THOR TIMES AGONY AUNT

I want to read 5.25 inch discs for the QL or IBM on my Thor. Can you help me to do this?

Yours hopefully
Disconcerted
Tunbridge Wells



The Thor XVI shapes up

CST RAM – Plus leads the field

INDEPENDENT tests carried out by Digital precision on all leading makes of QL ram expansion show CST to be in front in the memory speed stakes. Their 512K ram almost halving the time required by the standard 128K QL from 33 to an unbeatable 17 seconds to run a test program.

This time is equalled only by the built in ram of the Thor range; figures for the Thor XVI are still under wraps but are expected to show even higher performance.

In the second edition of their TURBO ENCYCLOPEDIA Digital Precision state "We use and recommend the CST RAM Plus add-on board, which is well designed and the fastest 512K RAM we have tested."

Just for the record, the Thor 20 completes the same test in 4.5 seconds! This speed however is because the 68020 takes advantage of its high speed on-chip code cache rather than accessing RAM.

SPEEDSCREEN

SPEEDSCREEN makes the Thor display up to TWELVE TIMES faster using the new optimised code by Simon N Goodwin, designer of TURBO and SUPERCHARGE.

SPEEDSCREEN requires no specialist knowledge to use, just load it! Displays look just as normal but are drawn much faster.

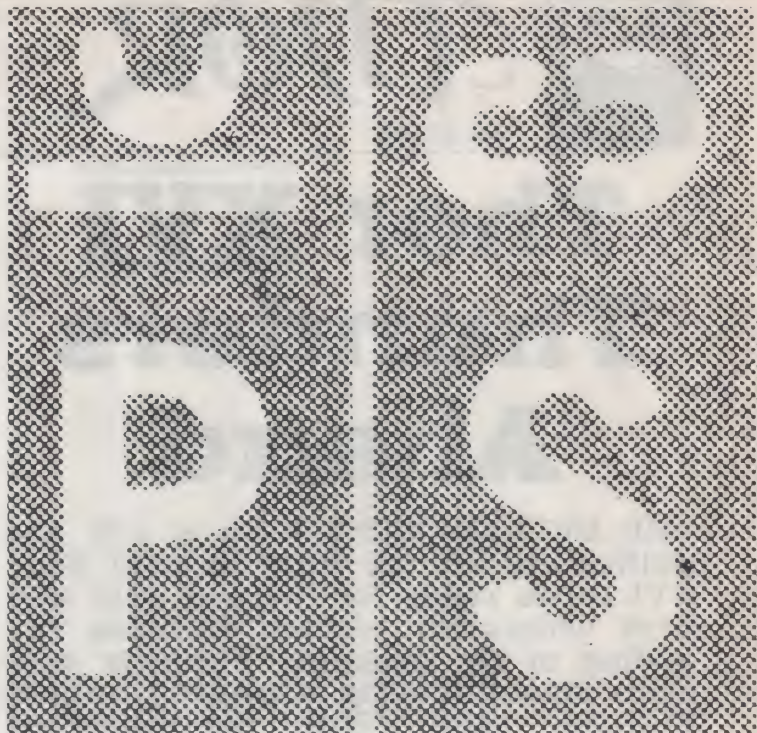
SPEEDSCREEN works with existing programs, without alteration, tests show dramatic improvements on: QUILL, THE EDITOR, COPY, LIST, PRINT, ED, VIEW, TURBO, ABACUS, ICE, FRONT, PAGE, PASCAL, C, FORTRAN, FORTH and lots more.

SPEEDSCREEN
Pricing
QL £20.00
Thor £29.90

Creative
CodeWorks

Next Month: Thor Ritzaus System Delivers the News

Back to the future



**Simon Goodwin
adopts the role of
history master in
this special review**

This article traces the history of the Psion packages, the four business programs supplied with every QL. It explains the differences between the many versions on the market, concentrating particularly on the later version 2 programs.

As with most complicated disasters, it is impossible to understand the behaviour of the Psion programs, famed for their bugs and slow speed, without knowing a little about QL development. Psion, the programmers, put in a vast amount of work on the QL packages since 1984 but most of that gallant effort was expended undoing the effects of the rushed decisions of late 1983.

The tale is not entirely gloomy, although recently Psion has forsaken the QL and concentrated on its successful yuppie electronic filofax, the Psion Organiser. Despite two years of development, the Psion QL *Flight Simulator* never reached the market but the last versions of the QL business software escaped and they include many useful new features, as well as corrections for old bugs.

I have noted the new features later and at the end I explain how you can upgrade your software.

When Sinclair demonstrated the QL to the press in January, 1984, the Psion packages were about the only QL programs which worked, or at least, appeared to work. Unfortunately that initial impression was rather misleading. Psion was a smallish London software house which had written some spectacularly successful games and utilities for the Sinclair Spectrum. Like Sinclair, it plotted a course upmarket in the mid-80s. It planned a suite of integrated business programs, individual programs which allowed data to be passed back and forth between them.

Integrated programs, or packages, were all the rage in 1983. MicroPro led the way with the *Star* family, *WordStar*, *SpellStar*, *CalcStar*, *DataStar*, *InfoStar*, *PlanStar*, *ReportStar* and so on, programs linked more by their names than their functionality. Then there was the *Easy* range, the *Perfect* package, and so on.

The Psion family was to be called *Xchange*, to emphasise from the start the way that data could be passed back and forth. In those days business programs were usually written in machine code, to get the best possible performance from limited memory and processor power, but Psion wanted to be able to move its programs between different types of computer, in particular from the QL to the IBM PC, so it wrote *Xchange* in C, a general-purpose language.

Psion software was developed on a large computer, a VAX supermini. That approach allowed the company to work on programs for many machines at once, even if some of the

target computers were not yet finished. That was just as well, as Psion still had only a card-frame prototype of the QL, with a single Microdrive, when Sinclair first demonstrated the packages.

The VAX made the development of the Psion packages possible but it caused many performance and compatibility problems which made it easy for people used to simpler systems to sneer at the first QLs.

Programming in C is all very well for most of the code but it falls down when you reach the nitty-gritty pieces which talk to the hardware of a specific computer, the operating system. As I explained in the August *QL World*, the QL was meant originally to have an operating system called CP/M-68K, similar to the CP/M and MS-DOS systems used on earlier business programs.

Unfortunately, CP/M-68K needed a good deal of memory and the Psion C compiler emitted verbose code – it was not possible to fit packages and operating system together in the same QL. So Sinclair decided to replace CP/M-68K with an in-house development, – not because it was better, although it was – but because it was smaller.

Last-minute change

That last-minute change complicated things for Psion. To keep things compatible, it wrote an MS-DOS Emulator so that its C programs could pretend they were running on an IBM PC. Whenever they needed to access the hardware, the programs called the MS-DOS Emulator, which trans-



lated the IBM PC system calls into whatever that day's version of the QL needed.

The MS-DOS Emulator insulated Psion changes elsewhere in the system but the extra communication step slowed things. The compiled C program was already significantly slower than hand-crafted machine code. Even when the QL was running there was not sufficient memory to load an entire program into RAM, so the packages were set up to load routines piecemeal from Microdrive as they were required.

That was an inappropriate way to handle Microdrives, which take several seconds to get started. The drives were also slowed by the need to communicate through the MS-DOS Emulator. If reading started a moment too late the tape had to turn for seven seconds before the same block of data arrived again.

Q includes two neat tricks to speed Microdrives but the original Psion packages could not take advantage of either. Q can read binary files very fast with an 'LBYTES' operation. It reads each block from the tape and slots any part of the required file into the correct place in memory. LBYTES can usually search an entire tape in a few seconds.

Unfortunately, MS-DOS has no such facility. As the Psion programs pretend to talk to MS-DOS they must ask the Microdrive to search for each data block in strict sequence, ignoring other parts of the file they may pass en route and usually forcing many extra laps of the tape.

The other helpful feature of Qdos is

the slave block, an area of otherwise unused memory which holds a copy of parts of the tape which have been used recently. When a tape is read or written the computer does a quick check to see if it can save time by using the slave block instead. Qdos needs two free slave blocks – one on late ROMs – to work and all except the latest MG ROM can crash if they run out of slave blocks completely.

Psion filled up the memory so that slave blocks were of little use; often the first version of the packages would lock up the machine by stealing the memory needed by the Microdrive handler. Psion could not predict problems like that by running the program on its VAX.

Short memory

Version 1 programs were not really suitable for serious use. File-handling was slothful and tended to crash the machine if memory was short. Problems in the duplication process made master tapes unreliable. Quill used to produce extra blank lines unless you selected 80-column display before printing.

It is not worth dwelling on the faults of version 1, except to make the point that you should upgrade them. Psion spent the second half of 1984 converting the packages to run on the ICL One Per Desk and the IBM PC. QL users continued to struggle with version 1 for almost a year before Psion revised the QL programs.

Version 2 was generally much better than version 1, although some serious bugs remained and a few new ones crept in. The code was en-

tirely re-written in machine code to make it faster and to fit all the program into memory at once, with extra space for data besides. The MS-DOS emulator remained, unfortunately.

There was much less risk of locking up the system by running out of memory and the programs loaded with EXEC, which uses the fast LBYTES routine. Sadly, they still would not multi-task because they grabbed virtually all the spare memory after loading, regardless of the capacity of the system. Nowadays you can run several packages at once but you need a front-end program such as *TaskMaster* or *GRAM* to make sure that memory is shared fairly.

Version 2 lets you select the type of ordering used in Archive and Abacus. You can choose ASCII ordering, compatible with most other computers, or pick the QL's wierd but useful scheme of interleaved lower-case and capital letters. Printer and screen format configuration programs were improved but had to be converted from version 1 format.

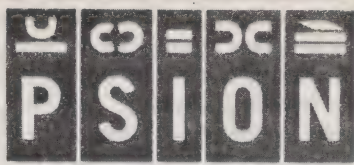
You can configure version 2 programs to use non-standard printers and interfaces. It is also easy to tell the programs to read data and help files from disc, although the screen prompts still refer to Microdrives. Previously you needed a CST utility to convert version 1 programs to run from disc.

The new Quill was much less likely to lock up the machine than version 1 but it still had a few non-fatal bugs in its handling of the text and status displays. Inserting text starting with a Tab could cause odd results, as could deleting the last character of a paragraph or inserting a new line in certain places.

A last-minute improvement for version 2.0 of Quill was intended to speed data-file handling. It worked very well unless files were more than 32K long, in which case SAVE and BACKUP would invariably fail with a plaintive file IO incomplete report.

Copying, deleting and typeface changes were made easier in Quill version 2, as you could move back if you selected too large an area accidentally. Those options still re-draw the screen over and over again, so they are still slow.

Archive 2.0 had some serious bugs. Like Quill, it could not write files of more than 32K. LOCATE and NEXT could get lost in ordered files and sometimes ORDER would fail to sequence large records correctly. ALTER worked well in version 1.01 but version 2.0 had a tendency to du-



plicate some records and delete others as it went along. Unstructured programmers could crash the machine by adding 256 lines to any procedure.

New features in Archive version 2 included the option to trace programs by pressing F3 while they run and a command to re-direct printer output to any device. New functions allowed formatted printing and direct manipulation of field names inside programs.

Version 2 of Abacus offered an extra 8K of memory for programs. It was fairly reliable but still had a tendency to get confused about the screen mode when deleting data or loading a new file.

The revised Easel was faster than version 1, had two new printer drivers and left an extra 4K for data. It could still crash if you asked it to show all possible graph formats when memory was almost completely full. Version 2.0 let you choose the scale of graphs, rather than tolerating a scale set automatically to match the data values. That makes it much easier to compare several graphs or to present misleading information, TV documentary style.

Psion patches

Psion produced patches for the most serious new bugs introduced by version 2 and they were incorporated into an interim release version 2.1. It was a vital upgrade for people hoping to process large files with Archive and Quill, although it slowed the handling of small files.

Version 2.3 was the next full release and fixed all the problems with version 2 which I have noted so far. Version 2.3 also allowed files to be transferred between packages over the QL network.

Version 2.3 adds yet more printer drivers for Easel. It copes better with curious or anxious users. It is no longer possible to lock the machine in a continuous loop by asking for Help about Help about Help.

The Quill 'Import' command is improved, in that you can choose whether to import 'by line', when each line read becomes a paragraph, or 'by paragraph', where each group of lines becomes a paragraph. Bad stylists and ungrammatical programmers, beware - Import cannot

cope with paragraphs more than about 3,800 characters long. Version 2.35 is not so different from 2.3, as the new number suggests. One pleasant feature is that repeated pressing of F3 toggles you between the two Quill Command menus. The programs no longer lock out parts of the QL memory as they run, so you do not have to re-set the machine between loading one package and another. That makes the Xchange concept a little easier to swallow, although you can manage with the earlier version 2.3 if you display the directory of every drive you intend to use before loading a Psion program.

Version 2.35 is the first to include a sensible garbage collection routine to tidy after heavy bouts of editing. Earlier versions could pause for several minutes, shuffling data furiously when tables became full and memory was short. That never happens for more than a few seconds with version 2.35.

Minor corrections

There are minor corrections in all four programs. Quill can GOTO large page numbers without problems. Archive no longer tacks extra spaces on to REM statements when you edit them. Easel can 'Kill All Figures' properly and Abacus knows how to cope with empty cells when ordering a row.

There is one new feature in Quill 2.35, an 'Export' command which lets you write a document to a file which you can LOAD subsequently as SuperBasic, VIEW, or edit with other utilities such as *The Editor* or *HiSoft DevPac*. Previously the only way to export plain text was to 'print' the document to a file, using a simplified printer definition.

Version 2 of Archive left 20K of memory for programs and internal tables on a standard QL. That was 8K more than version 1 but still rather restrictive, particularly for people selling applications programs written with Archive. One of those authors was Chas Dillon. He persuaded Psion to produce a run-time version of Archive, stripped of the program editor and command line interface.

Run-time Archive has about 34K of memory free for programs and tables on a standard QL but it will not let you type-in commands or procedures. When you load Run-time it reads and executes the Archive program in the file BOOT PRO automatically. Run-time Archive has no editor, so all programs must be saved and loaded in an internal form, rather than as text.

Version 2 of standard Archive also lets you load and save programs in the fast internal format, although the format differs for version 2 and 2.3. This new feature created a problem for the marketeers at Psion. They decided that people should have to pay to use Run-time Archive, even though it was distributed widely; many commercial programmers paid a £1 licence fee to use Run-time Archive in their database applications.

To compel people to buy the full Run-time development pack, Psion arranged that Run-time Archive should expect a non-standard internal program format. You cannot use it to run programs developed with the normal version of Archive.

People who bought the development pack needed some way to create Run-time Archive programs. The answer was Archdev, a version of standard Archive, complete with editor but zapped subtly so that it, and only it, could produce tokenised files acceptable to Run-time Archive.

One exceptional feature of Run-time Archive is a machine code call instruction. It can be used to bypass the slow Archive interpreter at key moments. Dillon has used the feature in his Archive programs and managed to speed some operations by a factor of 400.

Run-time Archive includes features which have also found their way, undocumented, into the latest versions of standard Archive. The PDQL Archive Tutor gives full details. Eleven box characters can be used to design neat screen layouts. They are available by printing character codes 225-235. When designing screens you can type those characters directly by pressing F5 followed by a letter from 'a' to 'k'.

Print styles

It is also worth bearing in mind that Archive recognises MS-DOS control codes, so you can move the cursor, select print styles and clear areas of the screen by printing sequences of IBM PC control codes.

Archive was the only program which continued in development after version 2.35. That was almost entirely due to the persistence of Dillon. Archive uses an internal index table to keep track of your data. The data is left in the drive, so it is the size of the index which determines how many records you can handle at one time.

Each record in the file uses a single slot in the index. The size of the slot depends on the number of orderings imposed on the file - a minimum

of six bytes, plus eight bytes for each ordering. So if a file was sorted by name and price, each slot would take up $6 + 8 \times 2 = 22$ bytes.

Dillon discovered that Archive used 16-bit pointers to manipulate the index, limiting the theoretical maximum size of the index to 64K. What was worse was that some of the index code used signed numbers and some used unsigned ones. Large unsigned numbers would be treated as negative or positive at different parts of the code, scrambling the index if it grew beyond 32K in size. The consequence of the 32K limit are shown in figure one.

Archive version 2.38 allows the index to grow up to 64K without prob-

lems, allowing twice as many records as previous versions. Apart from that it is the same as version 2.35. The intervening versions, 2.36

and 2.37, were unsuccessful attempts to fix the 32K index bug. There is no way beyond the 64K barrier, so the figures in the table show the maximum number of records you can manipulate with QL Archive. Even the QL clones, the CST Thor and the ICL One Per Desk, use the same 16-bit index.

Lucky readers

If you outgrow those sizes you will need to upgrade to an IBM clone and run the MS-DOS versions of Xchange, which allows up to 65,500 records and, naturally, has no need of the MS-DOS emulator. It costs £79.35, more than some lucky readers paid for their QLs.

Psion - 01-723 9409 - can supply upgrades for all four QL packages at £9 per cartridge. So far as the company is concerned, the latest version is 2.35 for everything except Archive, where it is shipping 2.36. It has no plans to produce further versions.

The snag is that Archive 2.36 still contains the very serious 'large file' bug. Archive 2.38 was not developed until after Psion ceased production of QL software. Version 2.38 is available from Psion but you can get it from Archive applications specialists

PDQL - 021 233 3042. The price is a nominal £5. You should enclose an SAE and a blank disc or cartridge with your order.

The run-time and development versions of Archive are available together from Psion at £19.95 for the pair. Alternatively, for an extra five pence PDQL can supply the corresponding version 2.38 programs.

The development of the Psion packages epitomises the story of the QL. Many good ideas were thrown in a pot and the whole lot was emptied into a computer before it had time to gel. Almost four years later the position is very different. Psion received few thanks for its efforts - more a falling level of abuse - but now the packages are much better-suited to the QL. They leave more space for data, work faster and have few vices when used to process small files.

The packages are still rather slow, mainly because of quirks and the presence of the MS-DOS emulator, but QL suppliers offer a multitude of cures for those problems - fast expansion memory, RAM and floppy discs, The Editor, TurboQuill and Speedscreen. If you take care in setting-up your system, QL Xchange can beat packages on other computers hollow, on performance as well as price.

Figure 1.

(Label) Maximum Archive database sizes

No. of ORDERS:	0	1	2	3	4	5
Version 2.38:	10800	4600	2900	2100	1700	1400
Vers to 2.37:	5350	2300	1450	1070	840	700

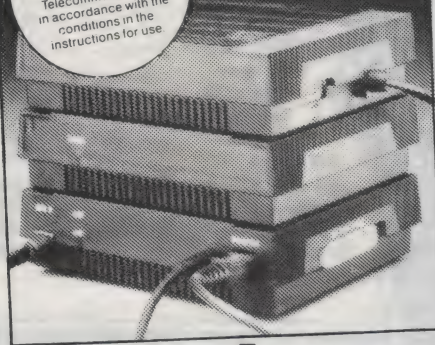
The table shows the approximate maximum number of records, assuming that the QL has extra RAM. The maxima for a 128K QL are lower and depend very much on the program version, type - e.g., Archdev or Run-time - and peripherals in use.

TANDATA COMMUNICATIONS

FOR THE SINCLAIR QL

UNBEATABLE PRICES!

APPROVED
for use with
telecommunications systems
run by British
Telecommunications
in accordance with the
conditions in the
instructions for use.



The only communications package for the QL. The modules are available separately but, by using all three as a complete matched system, full advantage can be taken of the integrated features.

Q-CONNECT

Complete RS232 output for general communications from 75-9600 baud with full two way buffering and flow control. Software on a micro drive to support all 3 modules includes Prestel Viewdata/Videotex and VT100 emulation, and many other features.

Q-MOD

Manual dial V23 modem operating at 1200/75 bps and 1200/1200 half duplex.

Q-CALL

Provides traditional pulse/loop disconnect auto-dial and auto answer.

Q-CONNECT Q-MOD
AND Q-CALL NOW ONLY

£80.49 INC. VAT & P&P

Q-CONNECT AND
Q-MOD ONLY

£47.64 INC. VAT & P&P

Please send me
Q-Connect/Q-Mod/Q-Call at £80.49 inc. VAT & carr.
Q-Connect/Q-Mod at £47.64 inc. VAT & carr.
(delete as applicable)

I am enclosing a cheque made payable to
Tandata Holdings plc OR charge my
ACCESS/VISA account

Number _____

Expiry date _____

I'd like to know more about Tandata
communications for the QL. ☐ (Please tick)

Name _____

Address _____

Tel _____

Send to: Tandata Communications,
Albert Road North, Malvern, Worcs. WR14 2TL.

Tandata

COMMUNICATIONS

Albert Road North, Malvern, Worcs. WR14 2TL
Telephone: (0684) 892421. Telex: 337617
Fax: (0684) 892422. Telecom Gold: 81:TAN001.

A subsidiary of Tandata Holdings plc
Prestel is a registered trade mark of British Telecommunications plc

ICE



ICE

£26.95p

£14.95p

£14.95p

- + Choice Multitasking Program
- + Toolkit especially for ICE users

ICE is a ROM based utility program that turns your QL into an ICON controlled "state of the art" computer. Not only does it add a number of functions not found on a standard QL including calculator and calender, it also makes all basic functions a dream to use.

ICE + MOUSE

was £79.95 NOW £59.95p

The Eidersoft mouse combined with the above ICE rom gives your QL the power of the Apple Macintosh or GEM. Mouse control is implemented on all packages that use the ICE system, which gives a very smooth and fast response that will not be outrun. If you already have ICE we offer a £10.00 trade in if you return your existing ICE.

ARTICE + MOUSEART

£14.95p

A keyboard or mouse controlled graphics program. The features include circle, line, box, free hand draw, paintbox colours and brushes, copy, transfer and save image. Epson printer dump, undo, spray can, recolour, text, mode 4 and 8 operation.

ICICLE

£14.95p

A multi-tasking utility that allows you to set up your own ICONS for the control of programs, including QUILL, ABACUS and a host of other programs. As well as a full ICON editor it includes a printer spooler and printer manager.

DRAWING OFF-ICE

£16.95p

3D screen designer aimed at producing true 3D images on your screen. The perspective is automatically calculated to a given vanishing point. This is not some complex co-ordinated program which requires you to work out every point of the 3D object in advance. Requires 3 1/2" disk drive.

ICE BERG

£14.95p

Set of comprehensive backup facilities which can be called up at almost any point when you are using your QL. It includes full wild card functions i.e. back-up all - doc or - pic files. The program also boasts a AUTOBACKUP feature backing-up specific files say every 10 minutes without you having to do anything.

GAMES



DEFUSION

£9.95p

Puts you in control of the "defuser", a funny little character whose job it is to collect small bombs before the fuses run out.

FULL HOUSE

£12.95p

A poker game with the added dimension of a one armed bandit style gamble facility.

QL CAVERNS

£7.50p

The classic platform game that brought BJ to our screens. Guide BJ through the 50 all action, all colour screens to collect each one of 395 diamonds scattered throughout the caves.

BJ RETURNS

£10.95p

Is the excellent sequel to QL caverns incorporating many of the excellent features and graphics of the original game.

BJ IN 3D LAND

£10.95p

BJ is lost again! This time in a 3D maze that will pose a challenge to all (70 screens).

KARATE

was £19.95 NOW £14.95p

Incredible graphics, 18 different movements including kicks, punches and somersaults. Multi screen action, large flicker free sprites, multi player option, sound effects, keyboard or joystick control.

SPOOK

£10.95p

Probably one of the best versions of Pacman for any Micro computer.

METEOR STORM

£7.50p

A classic "shoot 'em up" with sheet after sheet of asteroids to blast your way through while avoiding the spaceships that are trying their best to destroy you.

GAMES PACK

£16.95p

Comprising of ZAPPER, the classic arcade game, Eagle, a defender type game, and Citadel where you must unravel the secrets of a giant city as you steer your craft through 50 screens of danger and excitement and, finally, BJ returns.

ESS membership - £9.95

BIG DISCOUNTS AND IMMEDIATE ADVICE!!!

UTILITIES



Q KICK

£14.95p

Multi-tasking utility program including DESK, CLOCK, FILES, NOTES and TOOLS, similar to SIDE KICK on PC available only on disk.

GRAPHICS CONSTRUCTION KIT

£14.95p

A set of utilities that allow you to construct your own pulldown menus in SUPER BASIC.

Q WRITER

£14.95p

A marvellous utility for anybody who wants something different from their printer. Includes 29 different character sets of Epson compatible printers.

Q-SWITCH

£14.95p

Multi-tasking that permits a quick switch from ARCHIVE to ABACUS, QUILL or EASEL, suspending tasks while jumping to another task. Written by the author of ICICLE and KEYDEFINE this is a very popular package.

QSPELL

£24.95p

A spelling checker for Quill, supplied with a dictionary of 25000 words and checks an A4 page in 24 secs.

Q-FLASH RAM DISK

£14.95p

Allows the user to define ram disk, programs can then be instantly saved and re-loaded. A print spooler is also included to allow you print whilst using other programs.

QL to PC

£29.95p

Transfer your existing files to a PC for use within XCHANGE, PC FOUR or any standard DATABASE, SPREADSHEET or WORDPROCESSOR. Price includes software for both machines and cable.

QL TECHNICAL BOOKS (Set of 7)

UNDER 1/2 PRICE at £19.95p

PC FOUR for IBM compatibles

SPECIAL PRICE

£69.00p

Microdrive Storage Box £4.95p
Microdrive Storage Box with 10 cartridges £22.45p
Microdrive Storage Box with 20 cartridges £39.95p

ORGANISER



The machine that thinks with you

ITEM: TAXI-FARE AMOUNT: 5.28 24: TUE: 12.30 ALARM 24: TUE: 11.30 KE at Pison .6*sin(pi/4) 34558441227 from **£99.00**



Diary
Alarm
Calculator
Address Book
Organiser II CM £99.95p
Organiser II XP £139.50p
Finance manager £29.95p
Dictionary £29.95p
Comms link £59.95p
Spreadsheet £39.95p
16k datapak £19.95p
32k datapak £34.95p
64k datapak £79.95p
128k datapak £99.95p
Book on Organiser £9.95p
QL to Organiser £39.95p



E I D E R S O F T Q L

86 COMMERCIAL ROAD, PADDOCK WOOD, KENT TEL: 0892 832552



QL EDUCATION

QL EDUCATION

MONTH FOUR: Dealing with English

Leslie Fahidy looks at the teaching of English in the fourth part of his new series on education

Until now we have concentrated on the teaching of mathematics in this series; now it is time to look at the teaching of other subject areas. The most important topic, after mathematics, with which young children have to deal at school is English. All other subjects are important but mathematics and English have the central position in the educational system – the student must return reasonable results in both subjects to pursue an academic career. Young people cannot gain entry to any university course, or even most professional courses, unless they have a reasonable pass in O level mathematics and English, now to be superseded by GCSE results.

There are five areas in the teaching of English on which we must concentrate – vocabulary and spelling, grammar, comprehension, communication skills and punctuation.

Let us start with vocabulary and spelling and investigate the various techniques we may use to help young people to achieve proficiency. The aim is still the same as previously, to write computer programmes which will help the learner to acquire the necessary knowledge in this area. There is a clear dividing line between the two areas of vocabulary and spelling and our programs should reflect the fact. After all, there is a distinct difference between somebody knowing the meaning of, say, pseudoscientific and being able to spell it correctly.

Ability to spell

The level of the student also has an effect on how far we should go in separating a knowledge of vocabulary from the ability to spell correctly. If the program is intended for young

children, say in the 10 to 12 age group, it is a mistake if the child does not know whether it is "receipt" or "reciept". The 'e' before 'i' rule is important but a student preparing for his 'O' level English would not be penalised seriously for spelling psychology as psychology.

There are a number of approaches to teaching vocabulary, without taking too much notice of correct spelling; let me outline some skeleton algorithms.

1. Games of the *Hangman* type are suitable at a lower level, with the added advantage that the learning process appears to be entertaining. Correct spelling does enter the playing of games of this type but, since we would normally apply this method on the lower regions of the learning curve, the words encountered most frequently are likely to be simple and they do not usually present a spelling problem. To make a game more interesting it would be a good idea to arrange several sets of data and to use them for different levels of difficulty. The program could be written in SuperBasic, almost without regard to the vocabulary to be used and a different 'RESTORE «line»' statement incorporated, depending on the level of difficulty chosen by the student, thus presenting different sets of words.

2. An alternative approach could make use of Archive. The program could be written in SuperBasic but there is no point in going to the complications of writing a database manager in Basic, when the tools are already available in the form of a very high quality database. The program could proceed as follows – a dictionary-type definition is presented on the screen and the student is

invited to supply the necessary word. If the response is exactly as it appears in the database, entered previously by the author, the answer is accepted and the fact is acknowledged that a correct answer has been given.

Further search

If the response does not match exactly the content of the appropriate answer field in the database, a further search is undertaken which looks at all the different and commonly-made mis-spelt versions of that word. If it is found, the evaluation should state that the word was correct but the spelling was not. As a further embellishment, a list could be kept of all mis-spelt words and at the end of the session the student could be given further exercises to teach the correct spelling of all those words which have not been spelt correctly.

Needless to say, the success of this approach depends on the research which preceded the writing of the program and the compilation of the data to go with it. Not only must the vocabulary be correct, in the sense that it includes the words which the teacher intended to teach at this stage but, the most commonly-occurring spelling mistakes of that word must also be included in the data.

If the response entered by the student is not found, either as a correct spelling or one which is incorrect, the answer must be rejected and the correct answer displayed on the screen. If the answer contains a spelling mistake but is otherwise acceptable, the learner must be told that the answer was substantially correct but the spelling was incorrect.

3. Commerically-available spelling

MONTH FOUR: Dealing with English

checkers could be put to good use in teaching spelling, though not vocabulary. The scenario could be along these lines -- present a screenful of text with deliberate spelling mistakes. Invite the student to make a note of all words which are spelt incorrectly and then apply the spelling checker to the same text and compare the errors noticed by the student to those words which are rejected by the spelling checker.

There are three shortcomings to this approach. The first is that we must rely on the spelling checker being accurate and I have yet to see a spelling checker which is. Admittedly, users of the QL are in a better position than users of many other systems -- our spelling checkers are not usually written in American English.

The second shortcoming of the method is that since we cannot interfere with the software we cannot introduce evaluation of answers. All that will have to be left for the learner to deal with, which pre-supposes a certain degree of maturity. The third problem concerns the ever-present failing of all spelling checkers -- they will accept words whose spelling, though incorrect, is correct for a different word. For instance, if the intended word is 'could' and the student spelt it as 'cold', the spelling checker would accept it, since that is a correct spelling in its own right. This problem cannot be overcome until or unless we have a context checker available at a reasonable price.

Difficult problem

Teaching grammar is a more difficult problem than the teaching of spelling and/or vocabulary. Two possible approaches are:

1. Present a sentence on the screen, asking the student to analyse it and enter answers. The expected answers could be held in a data file and compared to those given by the student. Some care would have to be exercised in the writing of the program since, in most cases, there are

numerous answers which are potentially equally correct.

Suppose the question was: "What is the subject?" and the expected answer is: "Jack"; The following answers are equally correct and we must make sure that they are evaluated as such -- a, "Jack"; b, "The subject is Jack"; c, "The subject of the sentence is Jack", and no doubt you could think of many others.

The technique available to overcome such a problem is keyword searching. In this case, we would designate the word Jack as the keyword and so long as it is present, the answer is deemed to be acceptable. Such techniques, however, are not without danger. Suppose the student's answer was: "Jack has blue eyes" it, would still be accepted, since the keyword appears in it but, clearly, it is totally meaningless in context and incorrect. Only the author of the software can make up his mind how to deal with such discrepancies.

2. Present on the screen a piece of text which contains deliberate grammatical errors and ask the student to type-in the offending word(s). An extension of this method would be to ask the learner to type the corrected sentence in full.

The Chambers *Modern English Dictionary* defines comprehension as "act of understanding or of including" and that is what comprehension, as a part of English language, means.

When writing computer programs, either to teach comprehension or to test a student's ability to comprehend, we are facing the task of helping the learner to understand and put into context what has been read. We need to present text on the screen consisting of several sentences which contain relationships between the different statements and ask questions such as: "Who came in through the door?", "Why was the dog barking?", The questions have to be such that it is possible to answer them, based on the material presented. At a higher level, we may ask a question, the answer to which is not stated directly in the passage which has been read, but it may be concluded. The passage may not include a statement explaining why the dog was barking but if it stated that the dog saw a cat across the street, it may be concluded that that is why it barked.

The basic body of the program should not present great difficulties; the main problem is, as before, how to accommodate various answers,

each of which may be correct and, equally, how to exclude answers which could not be correct. It would be possible to write the whole program in SuperBasic but there is no need to punish ourselves with such a task. The QL is complete with an excellent database manager, which is programmable as well, and we could use it to provide the solution for our problem. The command language of Archive is a revised version of a highly-structured Basic, with the facility of almost unlimited screen editing.

Permitted answers

I suggest that two data files should be used, one containing the passage and the appropriate questions, the other the permitted answers to each of those questions. A great deal of research is needed to make sure that all permitted answers are included and I would advocate the provision of facilities to enable the user to add to the 'answers' database; somebody, sooner or later, is bound to discover answers which are perfectly logical but have not been included among the allowable answers.

Further, to make the task more interesting, I would suggest the creation of several database structures to give the user a choice of which to use. Alternatively, a random number could determine which data structure should be in use. Otherwise, unless a great deal of data has been incorporated, which means an extortionate amount of work, the comprehension

...DATA statements and the RESTORE «line» facility. A random number could be used in determining which block of data should be read. Apart from that, a further random number could be used to decide which of the data items read in should, or should not, be included in the task.

If each block of data contained, say, 20 facts and using random numbers we chose only five of those, the exercise could be much less predictable, without the need to enter excessive amounts of data. The student should then be presented with the items of information which must be included in a piece of written work and those pieces of information could be printed-out to present a reminder to the student, as well as a point of reference for the person evaluating it.

Whether the student prepares the answer by hand, or decides to use Quill to produce the required piece of communication, is not of major importance. I would, however, state that using a word processor has certain advantages apart from the fact that printed text is easier to read than hand-written; the world for which we are preparing children will be such that a certain amount of keyboard skill will be necessary for all who want to hold a reasonable job.

While typing is not as yet on the curriculum of most schools, particularly not at lower levels, I would encourage all school children to use a typewriter whenever possible.

I would like to make one more point concerning the teaching of communications skills. It is normal practice in most of schools that, except when dealing with spelling, spelling mistakes made in written work are more or less ignored. There are good reasons for the practice and I do not wish to criticise it; when teaching communications skills, spelling and punctuation are important.

In last month's instalment, dealing with the teaching of mathematics, I emphasised that teaching with a computer should be restricted to the lower age and ability levels. Those restrictions do not apply to the teaching of English, except for the fact that all the five topics now considered are such that writing programs at a higher level involves a great deal of effort. Bear in mind, however, that the rewards are also proportionately greater.

A number of changes have taken place recently with respect to the accepted rules of punctuation. The

changes may well be due to the punctuation used in many popular papers and have been adopted by more serious publications as well. What we must bear in mind is that, whatever the popular usage of punctuation, Examining Boards have not moved with the times and, consequently, we must teach punctuation in the old-fashioned way.

Two forms

The teaching of punctuation on the computer may take either of two forms.

1. Display a sentence on the screen without punctuation and invite the student to re-type it with the punctuation included. The evaluation of the response could be based on the same sentence, which is held in a different variable, with correct punctuation. The structure of the program could be straightforward; written in Basic, you compare two strings. If they are identical, the answer was correct, otherwise it was not.

2. An alternative method would be to display a text with incorrect punctuation and ask the student to correct it. Should you be able to think of sentences which have a different meaning, depending on the punctuation, that would present a worthwhile bonus. The structure of the program could be similar to the one in the previous case.

In both cases the program should be written without reference to the data file which holds the information and, when the program is run, the learner could be asked which data file to use. In that way not only will the test be more unpredictable but it enables the teacher to add new data files to the package.

Next month we will tackle another teaching topic, practical skills, a sadly-neglected aspect of computer education. A large number of practical skills cannot be taught on the screen of a computer but there are many which lend themselves to that treatment. Consider how many computer games you have seen which involve driving racing cars at high speed, round impossible bends. Is there any good reason why the same technique could not be used to teach young people how to drive safely and within the Highway Code?

You may have noticed that there have been no software supplements for two months. I have no good reason but the excuse is that I, too, must take time off occasionally for a holiday. I hope software supplements in Microdrive Exchange will be back in next month's issue.

teacher would become easily predictable.

In a sense, communicating skills involve the exact opposite of comprehension. When dealing with comprehension the task was that the student should read a passage of text and demonstrate understanding of it. In communications skills, the roles are reversed. The student is presented with some facts and is required to communicate the information to a third party, without omitting any of the details or adding fictitious ones.

At the present level of computer technology, certainly within the bounds of the QL, it would not be possible to devise a program which can achieve those aims. Generating facts, from a series of pre-determined data statements, is not difficult in itself; the problem arises when we try to evaluate the responses. No computer program of which I can think would be able to read a passage entered by the student, compare it to the appropriate data, and test that all information has been included in it without distortion and that no new information has been added.

Tested by hand

That does not mean we should abandon the idea of teaching communications skills with the aid of a computer. I believe that the computer should be utilised, even if the checking of the resulting piece of communication has to be tested by hand.

The program could be written in SuperBasic, making use of READ-

ABCElectronic

Andreas Budde
Högelstr. 10-12
D-4800 Bielefeld
West Germany

tel.: 0521/690381
telex.: 932974 budde d
telefax: 0521/61412

1. POINTER'S TOOLKIT

Pointer's Toolkit is intended to be a complementary toolkit for QJUMP's Super Toolkit II and/or QRAM or for Sandy's SuperQBoard with mouse. Naturally you can use it also without any of this hard software. It contains a background string-exchange command, for example, a command to kill all currently running jobs, a function which works like INPUT, but you may give a pre-defined text to edit (like the input used by PSION), a new RESPR which never returns not complete, even if there are jobs running, a monitor-save-job, and, if you have a command called POINTER or a file called PTR-IMI or PTR-KBD (from QRAM), there are commands which give you access to the pointer and real pull-down-windows from SuperBASIC!

WRITER'S TOOLKIT

Writer's Toolkit gives you new fonts (no normal QL Fonts), which you can use to write anywhere to the screen (with the new command WRITE). The new fonts include Old English, Antiqua, Helvetica, (and more) in different sizes. Fonts with a height of 8, 12, 16, 20, 24, 32 etc. are also possible. Now you can forget the ugly CSIZE 3, 1 QL fonts; Writer's Toolkit gives you beautiful fonts which you can use for example to make overlays for disk-labels. All fonts are defined as proportional, so Writer's Toolkit gives you not only nice looking fonts but also a nice face.

PRICE: 15£

PREIS 45,- DM

2. QL-BUS

Plug in your QL-Bus buffercard and the Expansions Port of your Sinclair QL enlarges from one to five slots with the possibility of an additional power supply. Apart from the Miracel Trump Card it can be used with

- * CST Floppy Disc interface
- * CST SCSI - Floppy interface
- * Sandy Super QBoard
- * Sandy 512k memory expansion
- * Miracel 512k memory expansion
- * QEP III E-Prommer
- * and all interfaces using the QL-Standards

PRICE: 98£

PREIS: 298,- DM

3. DOT SCIENCE + SRENCOPY

This program, which enlarges your QDos, is usable for all scientific and mathematical texts. It can be used with all standard software programs even your own basic programs. You need no special codes to work with it because the BOOT program loads all files and programs after checking the necessary parameters. The possibility of using several characters - for example greek letters, chemical and mathematical formulas is no longer a problem. All additional and of course the normally used characters can be printed on a EPSON compatible printer.

Screencopy enables the screen to be copied in four forms and different grey colours to a dot matrix printer. It is unimportant in which application you work, any pixel of the whole screen (512 256 pixels) is printed without losing any contents! You have to press CTRL+S only!

PRICE: 29£

PREIS 89,- DM

order form Floppy = 31/2" 2 X 80 Track

	item	price	floppy	cartridge
1	Pointer's Toolkit Writer's Toolkit	£ 15 DM 45,-		
2	QL-Bus	£ 98 DM 298,-		
3	Dot Science Screencopy	£ 29 DM 89,-		

Name and Address

Cheque, credit transfer to Postgirokonto Dortmund Nr. 90283-469
C.o.D (only in Europe (not UK, Spain, Greece, Northern Ireland))
Accepted, £ = export prices

Sensational

QL SOFTWARE OFFERS

Reversi	Only	£4.52
Decision Maker	Only	£9.04
Macro Assembler	Only	£15.82
Gardener	Only	£9.04
Touch and Go	Only	£4.52
Home Finance	Only	£9.04
Meteor Storm	Only	£4.52
Monitor	Only	£9.04

All items are excluding V.A.T.
Orders under £20 + £2 Carriage

epic

'Good people to deal with'

Dept. QL, 194-200 North Road, Preston, Lancashire. PR1 1YP



(0772) 555034



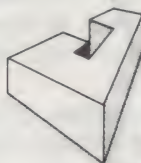
A NEW QL MEGA-TEXT ADVENTURE

During a routine flight to the moon Admiral Cola and Captain Franklin learn that the moonbase and mineral mine have been taken over by hostile aliens. To avoid enemy radar they land their spacecraft some distance from the base and then set off on a dangerous mission to recapture it.

Packed onto two cartridges this big-value mega-text adventure contains over 150 descriptive and imaginative locations and a wide variety of problems, traps, mazes and puzzles with logical solutions.

It includes an extensive vocabulary, over 50 objects and a number of intelligent characters capable of carrying out tasks.

Special offer £10 (including postage and packing) valid until 10th January, 1988. Send your cheque or postal order to the address shown below. Or telephone 041 552 0759 and quote your Access or Barclaycard number.



Javid Systems

15 Duke Street
Glasgow GL2 0JE

A MERRY CHRISTMAS AT THE MICROFAIR



NEW HORTICULTURAL HALL
 Saturday 12th December 1987 10 am-6 pm
 Greycoat Street/Elverson Street
 (Junction) London SW1
 Admission: £2.00 (Adults)
 £1.50 (Kids under 14 years)

SIZZLING SINCLAIR BARGAINS ON THE 12th DECEMBER 87

Come along and join in the fun at the Christmas Microfair. It's quite simply the biggest market place in the world for the whole range of Spectrum machines, plus full QL support and bargain prices.

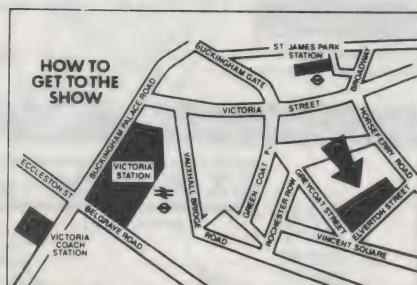
YOU'LL SEE

- ★ Thousands of games on sale – all the new releases and lots of special discount bargains
- ★ Utilities and serious software
- ★ Full hardware support – printers, tables, monitors, disc drives, light pens and lots of new products
- ★ Full range of books
- ★ Stationery extras – paper, cassettes, discs, labels
- ★ User clubs and expert advice
- ★ Z88 support
- ★ Top magazines
- ★ Special Christmas competitions and prizes
- ★ Restaurant, licensed bar

It's the user-friendly show that has out-lasting all the rest because everyone enjoys themselves... and you can always find a bargain.

Why not send today for cut-priced advanced tickets.

Exhibitors ring Mike or Moira on 01 801 9172 for stand availability.



Underground: Nearest stations are Victoria, and St James's Park.

British Rail: Victoria Station.

Bus Routes: 11, 24, 29, 70, 76 and Red Arrow 507.

Road: Signposted (RAC AA) Horticultural Halls.

SEND NOW FOR REDUCED PRICE ADVANCE TICKETS

Send to Mike Johnston (Organiser), Dept. S.U., ZX MICROFAIRS, 71 Park Lane, London N17 0HG.

Please send me.....advance tickets (Adults @ £1.50)

Please send me.....advance tickets (Child under 14 @ £1.00)

Name _____

Address _____

25th
ZX MICROFAIR

Please include a stamped, self-addressed envelope and make cheques/POs payable to ZX MICROFAIR.

SOFTWARE FILE

Master Warship

Grandmaster Warship

Complex Data Systems

Price £14.95 & £19.95

Warship and Grandmaster Warship are, practically speaking, one and the same game. The latter title is a souped-up mega-version featuring an extended playing area for which you will require 512K RAM. This extensive and complicated version of battleships for a computer is but one of a complete series of games, 10 in all, but with the exception of this one, not yet written by Complex Data.

Like all wargames, the objective is to win and you do that by capturing cities. All cities initially

are neutral and your tanks and troops can just roll in. Once a city is captured it can be set to work producing weapons of war to re-stock what you will inevitably lose in battle; you can even produce more troops, just like the real thing.

Although Warship initially seems to be very complicated the method of operation is straightforward and you can pick up things very quickly by playing. The introductory menu provides a beginner's game for this purpose, though I would not bother with the demonstration, which is utterly confusing.

You are provided with four fleets and each component, whether it is a submarine, an aircraft carrier, or whatever must be given instructions. A white cursor appears over the active vessel

and relevant information such as its type, armaments, location, heading and speed are displayed. As well as changing direction, various other instructions can be given. You can launch aircraft from a carrier, disembark infantry or tanks from a troop or tank carrier. The main map screen also supplies other information, including grid references, the time and date, names of vessels and positions of other ships and islands.

Attacking the enemy is carried-out in true battleships style. By occupying a square on which they are resident the QL works out the odds and you are informed whether you are the victor or a piece down. Enemy ships cannot be seen until they are close to your own; unexplored areas of territory are similarly obscure, so

a good deal of scouting around is necessary.

There is plenty to Warship and having played it for a few hours I get the impression there is much more to be discovered. It is certainly not superficial. There is more detail than I have outlined and I do not think even the most demanding strategist would be dissatisfied. The game can be played on two or more networked QLs, which opens some very exciting possibilities. Unfortunately the game suffers from amateurish production – mainly spelling mistakes and irrelevancies in the instructions – but that is something to which QL gamers have become accustomed. I am no wargame fanatic but despite being deterred initially by the complex and fussy detail, I found that Warship was well worth the effort.

TRANSFORM LTD.

Computer Accessories

MAIL LIST

£24.95

Allows you to retrieve names & addresses from within ARCHIVE. Other features include single key functions, prints address labels, exports files to Quill also compatible with our stock control.

STOCK CONTROL

£24.95

Keeps records of all stock items including retail price, trade price, minimum order level, items on order & many other features.

QL SWITCH

£14.95

Allows users with extra memory to run Quill, Archive, Abacus & Easel at the same time or two Archive programs & Quill.

MICRODRIVE STORAGE BOX

£4.95
Single Box

Box + 10 cartridges

£22.45

Box + 20 cartridges

£39.95

Please add £1.30
p&p

PC FOUR

£79.95

A cut-down version of Xchange as supplied on the QL but with the added facility of 65,535 entries in Archive, 999 lines in Abacus & mail merge plus key define built into Quill.

QL to PC £29.95

PSION XCHANGE

ARCHIVE DATABASE

Multifile relational database. Only memory restricts the number of files in use at one time. Variable length records with a maximum of 255 characters per field, 255 fields per record, 65535 records per file. Command language allows the user to define procedures using a powerful editor. Flexible multilevel indices provide fast access and a form designer for screen and printer input and output.

QUILL WORDPROCESSOR

Text and page formatting, underlining, bold, italic, superscript, subscript, justification, tabs, line spacing, page size, page headers, footers and numbering. On screen editing, fast page access, cut and paste, block copy, block move, insert/ overwrite modes, search and find, search and replace, key define and mail merge. Document size only restricted by disk capacity, background printing allows the user to print documents while working on others.

£295
INC. VAT

EASEL BUSINESS GRAPHICS

3D Business graphics including bar, line and pie charts, no limit to the number of values or numbers or sets of figures. Automatic rescaling, user define colours, text annotation of graphs at any pixel point. Intelligent evaluation of data formulae or manipulation of existing data. Images stored in internal format; monitor resolution is the only limit on final image quality. Accepts data from spreadsheet, database, etc.

ABACUS SPREADSHEET

Expansive spreadsheet with 999 rows, 255 columns, virtual memory system buffers to disk only when full, facilitating very large spreadsheets. Efficiency memory used only for full cells, each cell only uses 14 bytes. Variable width cells, block copy, block move, insert/ delete columns and rows, merge and consolidation of data from different spreadsheets. Accurate to 15 significant figures, full range of mathematical, scientific, date, average, ASCII and DIF conversion.

PC FOUR £79.35

PRINTERS

LX 86 215.00 +vat

DOT MATRIX

Citizen 120D	£209.00
Seikosha SP180A	£208.85
Epson LX 86	£247.25
Taxan Kaga	£287.50

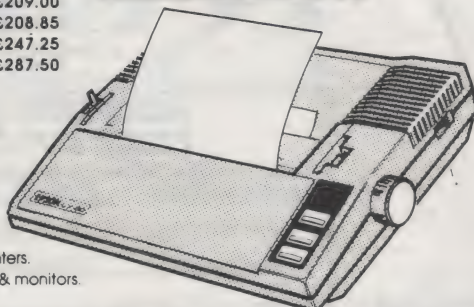
DAISYWHEEL

Brother HR20 daisy wheel	£495.00
--------------------------	---------

ACCESSORIES

LX tractor feed	£20.70
-----------------	--------

We also stock ribbons for the above printers.
Please add £5.75 for delivery of printers & monitors.



TRANSFORM LTD (DEPT. QL)

01-658 6350

Mail order only. 24 West Oak, Beckenham, Kent. BR3 2EZ

VISA

The QJUMP Pointer Interface

The QJUMP Pointer Interface is the core of our development plans for the QL. This is the new standard in multi-windowing multi-tasking environments. It gives you mouse, cursor key or single keystroke control of your QL. Only QJUMP brings you a completely new environment for your expanded QL, providing non-destructive windows for any well written program (and most badly written ones too!) no menus to set up, no silly limitations, just CTRL C to switch between programs. This is the way forward for QL users, while most software will work with it, the best of the new software coming will not work without it. The QJUMP Pointer Interface makes your QL really work!!

QJUMP Pointer Interface Products

GRAM is the RAM based utilities package designed to get the best out of any QL with at least 256 kbytes of additional RAM. GRAM is the starting point for any Pointer Interface system. The GRAM menus pop up at the touch of a key to provide instant access control of your QL.

The FILES menu can View, Execute, Copy, Backup, Move and Delete files using directories sorted on Time, Date, Name, Length or Usage. The PRINT menu can SPOOL multiple copies of any number of files, with or without page throws at the end. The JOBS menu gives you control over all the jobs in your QL, while the CHANNELS menu allows you to find which jobs are using which devices or files.

It also includes a comprehensive Window and Screen Dump and a superfast dual mode RAM disk and dynamic printer buffer. English or Deutsch.

GRAM £29.90 (£26.00 export) Available on Mdv /3.5 /5.25

QIMI is the Internal Mouse Interface from QJUMP. The QJUMP Pointer Interface automatically detects the Internal Mouse Interface so no changes are needed for any programs which use the QJUMP Pointer Interface. QIMI is the only mouse interface which leaves all of the QL's expansion facilities free for other peripherals. QIMI fits right inside the QL and is supplied with tools. QIMI is ATARI mouse compatible.

Battery backup is now available for the QL's Real Time Clock. Not just the simple battery as supplied by others, that was too unreliable for Sinclair to give away. This incorporates a turn-on glitch suppression circuit which has been shown to improve the reliability of "bad" clocks by more than 50 times. Only available with QIMI or as an upgrade to QIMI.

QIMI	£29.90 (£26.00 export)	+RTC £39.90 (£34.70 export)
QIMI+mouse	£69.90 (£60.80 export)	£79.90 (£69.50 export)
GRAM+QIMI	£54.90 (£47.75 export)	£64.90 (£56.50 export)
GRAM+QIMI+mouse	£89.90 (£78.00 export)	£99.90 (£86.85 export)
RTC upgrade for QIMI		£19.95 (£17.35 export)

QTYP is a versatile typing checker for all users of the QJUMP Pointer Interface. Check as you type, or run your (almost) finished document through it as a final check. Pop-up windows advise you of unknown words, suggest correct spellings given partial words, and warn you about difficult words (do they get easier with practise or practice?). You can even use it from within your own programs, for instance to analyse documents for consistent mis-spellings or range of vocabulary.

QTYP is supplied with a 40,000 word English dictionary, which you can extend or edit. Other language and specialist dictionaries can be created to your own requirements using the dictionary editor supplied with QTYP.

QTYP needs the QJUMP Pointer Interface supplied with GRAM.

Until 31 December 1987 Only!!

QTYP	£19.95 (£17.35 export)	Available on Mdv /3.5 /5.25
1988 price	£29.90 (£26.00 export)	Available on Mdv /3.5 /5.25

QPTR is the complete QJUMP Pointer Interface documentation and Pointer and Window Manager toolkit. It includes SuperBASIC and assembly language interfaces, design tools, examples and the latest Pointer Interface and Window Manager. Now you can join the QJUMP Pointer Interface bandwagon in SuperBASIC or assembly language.

QPTR £29.90 (£26.00 export) Available on Mdv /3.5 /5.25

Watch this space for more QJUMP Pointer Interface products from QJUMP.

Other QJUMP Products

QJUMP SuperToolkit II. The "clear market leader" (QL World) in Toolkit ROMs. Why buy separate keydefine programs, job control utilities, default directory utilities etc. when QTK II has them all and more? "Jedem ernsthaften QL-Anwender zu empfehlen" (Computer Kontakt).

QTK II £29.90 (£26.00 export) On ROM /Mdv /3.5 /5.25

QMON II Monitor/Debugger with single line assembler/disassembler, normal as well as conditional breakpoints, trace and backtrace, search, macro commands, transient windows and full window memory editor and much much more. "Das absolute Spitzenprodukt" (68000er), can we say more?

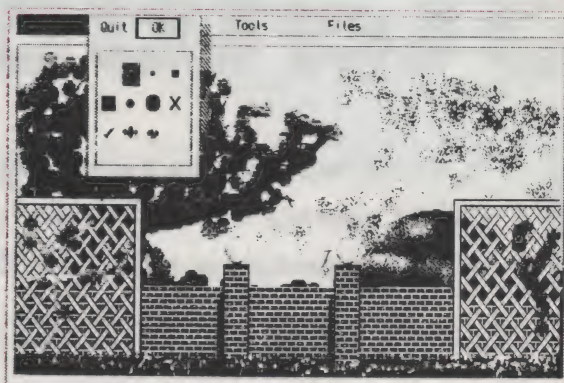
QMON II £19.95 (£17.35 export) Available on Mdv /3.5 /5.25

QEP III is the "Rolls Royce" (Sinclair User) of EPROM programmers. Many QLs have been bought just to use QEP III. Programs EPROMs 2716 to 27512, NMOS or CMOS. Features high and low voltage verification. Too many facilities to describe here, it puts £1000 EPROM programmers to shame.

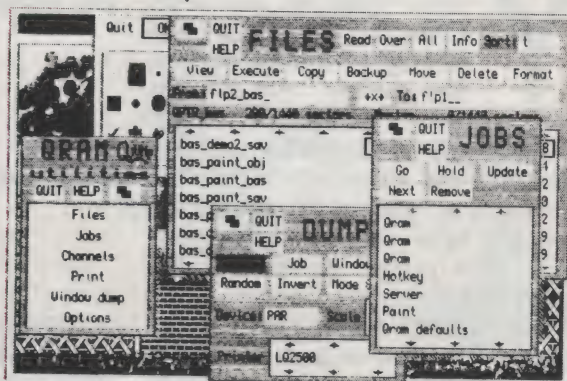
QEP III £129.95 (£113.00 export)

QJUMP can supply floppy disk drivers for those who have been left with unsupported floppy disk systems. Available for Medic (gets round many of the faults on some of the early Medic disk drives) and MicroPeripherals, version 3 or version 5 (provides compatibility with the rest of the QL world and improves performance).

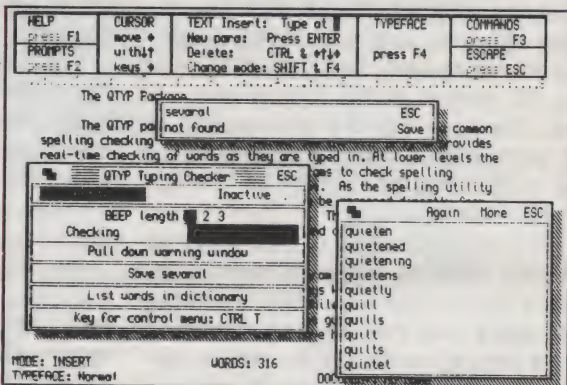
QFLP £14.95 (£13.00 export) for Medic, MP ver3 and ver5



The PAINT demonstration program FREE with QPTR



PAINT and GRAM showing FILES, JOBS and DUMP menus



Quill with QTYP warning, control and list menus

Please add £1.00 post and packing (UK) or £2.00 (Europe). Payment by UK cheque or PO; direct transfer to Barclays Bank, Benet Street, Cambridge. Code 20-17-19, account 30744557; Access / Mastercard / Eurocard / Visa; Eurocheque in Pounds Sterling (<£200) with the card number on the reverse; International Girocheque in Pounds Sterling. Personal cheques drawn on a non-UK bank should be in local currency and should include an additional £3 to cover the bank negotiation fee.

QJUMP

24 King Street
Rampton
Cambs
CB4 4QD
Tel 0954 50800

QL goes Stateside

In this article James Lucy takes a general look at the QL market in the U.S. and reviews a number of software packages from Quantum Computing

You better listen and listen good. That li'l old outfit called Big Blue sure blew it designin' that PC thing. It don' mean nuttin' that you'll find one in every office in the universe – the QL oughta be there, no bull. Qdos jus' blows MS-DOS in the dirt and y'all should be boning up hard and heavy on 68000 programming, 'fore ya get dumped in the brain-dead bin.

Or so implies Frank Toemay, the unequivocal head of Quantum Computing in the U.S. Quantum Computing contacted *Sinclair QL World* recently, offering details of its QL-related services and a number of programs for review. Before we look at the QL scene in the States and assess the New World's contribution to QL software, it is worth reflecting on the surprising popularity of the QL world-wide.

As some indication of international interest, Quanta, the independent QL users' group, has about 500 overseas members and they can be assumed to be only a fraction of the total number of overseas owners. Due in no small part to the efforts of Toemay and Tom Bent, another U.S. QL enthusiast, about 60 Quanta members may be found across the Atlantic in the U.S. and Canada. A further concentration is centred in Scandinavia and most of the northern European countries have a few tens of members each. Australia, New Zealand, India and various ex-colonial African countries seem to account for most of the rest.

Another barometer of international interest is the software written in,

some countries. France and Germany either have been or are major



sources of supply of some interesting programs, ABC Elektronik and Pyramide springing to mind, and *Sinclair QL World* has even contained software advertising from as unlikely a place as Ankara, Turkey.

Further afield, Vaibhav Dahake is a QL owner from the Bombay area of India and tells me of an active local computer club with several enthusiastic QL owners; they have some problems, though, among them being keyboard membranes which wilt under the combination of heat and humidity and the three-times U.K. price of most QL items. Similar problems seem to be faced by the frontiersmen QL owners of Africa.

To return to the U.S. where climatic conditions are in the main less adverse, the other enthusiast mentioned and active in the QL field is Tom Bent. He reckons that the QL market in the U.S. is small, around 3-4,000 QLs, but nevertheless was producing until recently, and probably still is, a very informative and interesting journal with the name *Quantum-Levels*. Despite his enthusiasm, he accepts that he is in IBM and Apple heartland and that the QL is likely to remain a minority machine. Not so

Toemay. Toemay also produces a remarkable catalogue for the QL, much more comprehensive and detailed than anything I have seen from the machine's native country. He offers almost every item of software available for the QL, a good range of hardware including the Futura and Thor, and even has plans to market Leon Heller's add-on Transputer board for QLs and PCs.

His style is to denigrate the architecture and operating system of the IBM 'cloneys', as he calls them, while at the same time describing the QL in terms which make me wonder if he is talking about the machine I know.

As a self-styled QL innovationist and visionary, Toemay obviously felt the need to market his own software. The programs are available in Europe from an organisation in Middlesex under the name Qmonix Code, priced between £10 and £15. What does a QL visionary produce when selecting software to publish? Let us look – and it is worth mentioning that these are pre-release versions.

Qcom Address book, £14

Not a good start for a visionary. What is the first program of which you think when you have graduated to using the filing commands in SuperBasic? Birthday list, computerised index to your record collection, or even an address book? When I tell you that this program is EXEC'd but requires the Qjump Toolkit II to be present, you should be able to guess that here we have a compiled Basic program which probably makes use of the additional filing facilities provided by the Toolkit. Suffice it to say it had the look and feel of a program developed by a home enthusiast for his edification and subsequently tidied for use by others.

The program provides a neat menu-driven environment for storing, retrieving, searching for, printing and sorting addresses.

Everything goes well until you have to enter your first address and find that addresses are in the American format. If you had designs on the State field for entering your county that is tough, because it provides only for the two-character State abbreviation. If that proves a trial, you can instead ponder what to do with the zip code.

Things are not much better when you use the program. The thing is not sufficiently error-trapped and, before you know it, there is the Q Liberator compiler error screen giving you information which is of no use, since

the SuperBasic source is not supplied.

Address book is a program which is of not really usable and in any case fulfils a function which can for most people be better served by a little pocket book and pencil. If you must have a computer version, spend a rewarding evening with Archive-filing information is what it is for.

Quantum Disc manager, £14

This program is available in a disc or Microdrive version, the disc version working only if you have two drives. Once again it requires the QJump toolkit. Effectively, the program creates a database of directory information from all your discs or Microdrive cartridges and then performs database services on it. As expected, you can search for programs and be told on which cartridge or disc they appear, you can print-out the list or you can view all files or just those on a particular disc. All work is again done through a neat menu system with moving-bar highlights, together with screen forms for input.

The disc manager imposes a filing system on you, assuming that all your cartridges are labelled from one to 1,000 and that you assign a letter to each cartridge designating the type of programs on it, U for utilities for example. It is again insufficiently error-trapped and it was not at all difficult to come face-to-face with the Q Liberator compiler error screen. This is no fault of Q Liberator, of course.

I would again question the point of this program. It is very easy from SuperBasic to list directories to a printer, or even a file, combine this with sensible labelling of discs and I suspect it would be rare person needing this kind of program.

Draw Poker, £10

This is the pick of the bunch, neat graphically with an element of addictiveness. Once again, it needs QJump Toolkit II. The game is a standard five-card draw poker, with five players. The QL will either play itself, or will compete against you while dealing the cards, keeping the score and so forth. The graphics are detailed but clear, at least on a monitor, and the speed of betting can be set to suit yourself.

Playing the computer and risking your money against the unseen faces and cards of the other players proved surprisingly addictive, certainly far more so than in the appalling fruit-machine simulations which are available.

Notwithstanding its expressionless face, the computer did not seem too good a player. Lacking ten-gallon hat, cigar and steely glint in my eye, I managed to amass a paper fortune, despite not knowing the difference between a straight flush and a U-bend. Anyway, I enjoyed it but perhaps a seasoned gambler would require more competition.

Keyboard Drill Sergeant, £10

This program could well serve as an object lesson in how to get software wrong. It purports to improve your keyboard skills but is repetitive, limited and misguided.

It is repetitive and limited because you get 10 runs at the same exercise, which consists of jabbing randomly-selected keys as fast as possible. In theory, it adjusts the speed expected of you according to your performance but in practice this was gross and insensitive.

It is misguided because it assumes that keyboard skills consist of hitting single keys sporadically and because it is so badly executed. The key you are expected to hit flashes,



making it difficult and slow to read; it is sometimes presented in the context of the other keys on the keyboard and sometimes not; silly and occasionally insulting messages appear on the screen if you fail to measure up to the program's unfathomable standards, and the whole awful experience is conducted to the accompaniment of an appalling and compulsory cacophony from the QL beeper. I think on balance this is one to avoid.

QL Kitchen aid, £14

This program is again a database written in compiled SuperBasic, this time storing recipes and recalling them at will. designed by a professional baker and former owner of frozen food, cake and pastry production companies. We are told that "the current professional field rendition of this program, running on a QL, is controlling the entire daily production of a large baking factory located in a multi-story (sic) building located in New York City". Good to hear that it works at altitude.

It does not seem to work at sea level, though, because my copy crashed regularly; in fairness, we are told that this is a preliminary version. It does not know a flip from an mdy, nor a par from a ser, has not heard of metric units, and is difficult to use for anyone other than, presumably, the designer.

Unless you want to beat your QL with dough-covered fists, another notebook and paper job, I am afraid.

Chequebook manager, £19

Another idea which does not befit a visionary. In the unlikely event that you want to sit at home and enter details of standing orders, cash dispenser payments, cheque payments, deposits, interest, service charges and so on, this program lets you do so and will tell you all about the entries you have made. Spreadsheets like Abacus are good at that kind of thing, too, and let you make prejections into the future.

Summing up

There is, I am afraid, a world of difference between a program designed from the outset to be a commercial product and one which has evolved from something intended for personal use. With the possible exception of Draw Poker, all the programs will serve only to reinforce the low opinion of the QL typically held by the unconverted and will therefore be counter-productive in Toemay's evangelistic campaign.

On the other hand, the QL community should be grateful that in the most important computer market in the world, the QL still has some dedicated supporters who are prepared to put money and effort behind the machine. The Quantum Computing catalogue is excellent, prices are good and from what I have heard, service rivals U.K. leaders like Qjump and Strong.

Addresses

Frank Toemay
Quantum Computing
Box 1280
Dover NJ 07801 U.S.A.

Tom Bent
Quantum Levels
4016 Flicker Place
Columbia MD 21045 U.S.A.

Quantum Computing Qmonix software from:
HB Computer Sales
Littleton House
Littleton Road
Ashford
Middlesex TW15 1UQ
0784 248616

MICE

THE COMPATABLE MOUSE SYSTEM

Yes thanks to some thoughtful design and some clever software, this mouse kills those compatability problems that plague the others on the market and cause them to rely on expensive specially written software. Ours does not!! The smiling mouse is already compatible with literally *hundreds* of programs, including many of the popular commercial ones and even the ever fussy Psion ones work with it!!!

The mouse simply plugs into the ROM port on the back of your QL and the software, which gives full control over the mouse with just a few simple basic commands, can be provided on either microdrive cartridge or 3.5" disk. Or you could even buy it with one of our bundles - the choice is yours!!!

TOOLS

THE ULTIMATE BASIC EXTENSION

No toolkit has ever before ventured so far to bring out the super computer abilities of your QL. There now follows a brief description, if you want more details please do not hesitate to write.

First of all the toolkit contains all of the mouse commands that are detailed above together with new ones that provide on screen pointers controllable from either the mouse or the keyboard.

A 32 Icon fully definable environment is provided to be from within your own programs making them simple to use and even more user friendly than you thought could ever be possible.

User definable function keys are at last brought to your QL, these can help make your QL a joy to use.

The character set is made fully definable and simple routines are provided to allow use from within both your own and other peoples programs.

A complete sprite system is provided giving you 32 super smooth fully controllable sprites each of which may have up to 16 frames of animation and they can even outstrip the QL when it comes to speed!!!

There are also lots of new graphics commands - many of them are duplicates of the existing graphics commands in all but one important aspect - patterns, instead of them drawing in solid colours or stipples, the new ones draw in one of 32 user definable patterns. There's even a paint command that will fill any shape with any user definable pattern!!!

There are four screen dump routines provided in the toolkit. One of the most amazing aspects of this toolkit are the new desk top publisher style character routines. The four basic sizes of character each of which may be expanded to any size you want, you'll find no rough edges on our characters, unless you want them there.

All these features are easily used from basic or where appropriate machine code. A full set of designer programs are included as is full documentation.

The complete toolkit is available on MOV or 3.5" disk.

GOODIES

Front Page	£20	Front Page Extra II	£39
Office Junior.....	£20	QLiberator VI.3	£55
QLOAD and QREF	£9	Turbo and Toolkit.....	£90
Supercharge.....	£45	Super Media Manager	£35
The Editor	£28	The Editor Special.....	£35
Eye-Q	£28	Turbo Toolkit	£28
Better Basic System	£24	Super Monitor	£18
Trump Card	£190	Dual 3.5" Disk Drives	£190
Trmp Card and Drives.....	£345	Centronics Interface	£18
10 Blank Cartridges.....	£18	10 Black 3.5" disks	£17

Lots more goodies available - please write for full list

PRICES

Smiling Mouse	£40
Complete Toolkit II	£30
Mouse and Toolkit	£60
Mouse and Eye-Q	£65
Mouse and Office Junior	£60

ORDERS

All prices included U.K. postage - Please add £1 for Europe or £2 for anywhere else in the World

U.S. Distributor:

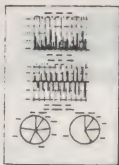
Quantum Computing, Box 1280, Dover, New Jersey 07801

Please send your orders and enquiries to:

Smiling Software
 8 Croxton Close, Marple, Stockport SK6 7RQ
 Tel: 061 427 5245



PACIOLI



PACIOLI is a money control program for people that wish to take full command of their financial affairs.

Once initiated PACIOLI shall return strength and performance ratios and pertinent trends, perpetually.

- embodies the secrets of double entry book-keeping.
- easy to use, supplied with model for quick learning.
- automatic updating of ledgers, profit & loss account and balance sheet for instant viewing.
- generates monthly, quarterly and annual spreadsheet records automatically.
- graphical representation of data with histograms and pie charts.
- hardcopy facility.
- in quick loading, fast running, multitasking code.

Supplied on microdrive, price including VAT and p&p

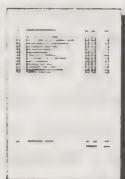
ONLY 24.95

(PACIOLI uses 95K of RAM)

**ZEATLINE
PROJECTS
LIMITED**

3 York Close
Washingborough
LINCOLN LN4 1SQ

Tel: (0522) 792378



Only Firstman Services

'COMPUTER CLEANER' Tried and tested mains filters. Full spec - LCR filters + spike suppression. 40 to 80 db noise reduction. 130 joule cut in « 10ns for each spike filter.

"A test rig supports it's claims to being an effective and efficient design. Response time to mains variations is somewhat better than advertised"

- Ron Massey QL World (Sep 87)

1-way (5a - LCR + one spike filter) £14
3-way (5a - LCR + 3 spike filters (L/N, L/E, N/E) £18
4-way (13a - spec as 3-way + 1.5m lead) £24

Qualsoft QL TERMINAL EMULATOR - viewdata/ASCII/VT52, phonebook with autodial/logon, XMODEM (CRC or checksum), all on line help and commands via pulldown windows, configurable for Astracom/Tandata and any buffered modem, full viewdata pixel editor, full multitasking (QRAM hotkeyable), support on Peacenet. Many many more features £30

ASTRACOM intelligent modem with text status messages. V21/23 Hayes protocol, parallel printer port (5k buffer), with QL ser2 lead (BT approved) £175
As above with 1200/1200 full duplex (v22) (BT approved) £290
V22 upgrade to existing Astracoms (converts to Hayes - ring for details) £135

QL TELEPEN BARCODER Read and write ASCII barcodes (text, numbers etc) - for EPSON compatible printers. Will print ASCII text from keyboard or file (Quill print files, Basic programs, Psion export files etc). Use for archiving, stock control, library booking etc 8085 processor.

TELEPEN Barcoder (renovated professional model »£500), QL program £85
1.5m serial lead (std QL lead with 25 pin plug via ser2) £9.50
1.5m serial lead (25 pin socket via ser1) £9.50

Prices inclusive of VAT, post and packing



**SEE US ON 12 DECEMBER AT THE ZX MICROFAIR
- ON LINE DEMONSTRATIONS OF MODEM**



**12 Bouverie Place, London W2 1RB. Tel: 01-724 9053
Telex: 265451 (quoting BT Gold 72:MAG90645)**

PRO CAD 3

**A PROFESSIONAL 3D
MODELLING PACKAGE**

AS REVIEWED
OCT. 87
QL WORLD.

"PC3 CAN BE HIGHLY RECOMMENDED"
RON MASSEY

**VERSION 2 NOW ONLY
AVAILABLE FROM**

DATANET SYSTEMS

£35.00 + £1.00 p.p. U.K. OR
£3.00 p.p. OUTSIDE U.K.

FOR FREE DETAILS SEND SAE TO

**DATANET SYSTEMS
6 THE HEATH,
BREACHWOOD GREEN
HERTS SG4 8PJ**



SUPER BASIC

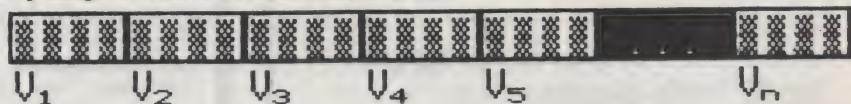
Mike Lloyd continues his series on data handling with an examination of vectors and arrays

The only way the QL or any other digital computer can store information of any kind is by converting it into numbers and storing it in bytes of memory. Everything in a computer memory, whether it be strings, programs, character shapes, machine code routines or system variables, is all stored as 8-digit binary integers. By using a high-level language like SuperBasic, programmers are largely protected from having to consider data, of whatever type, in its raw, digital state. Such blissful ignorance can be a handicap and so this month's article is devoted to static data structures, of which arrays are the most commonly-known example.

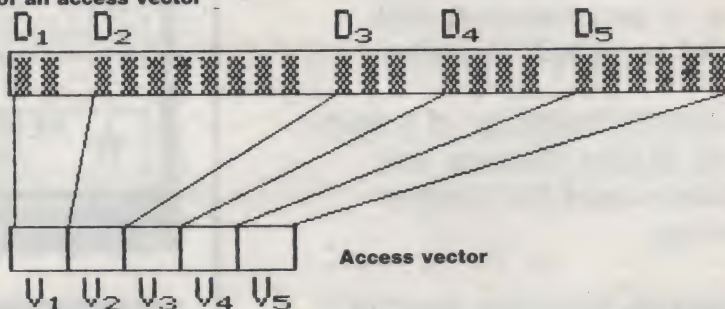
A single byte is not a particularly useful storage medium because it can represent only 256 values. Nevertheless, it is often used as a pointer to tables of information. For instance, the command to print an ASCII character, such as `PRINT CHR$(65)`, uses a single byte value, 65, to indicate where in the character font a particular character shape is located. The QL can also consider groups of two or four bytes, i.e., 16 or 32 bits as single entities giving maximum integer values of 65535 and more than four billion respectively.

Bytes have two essential characteristics, value and location. To appreciate the importance of both features,

● Memory usage of a 32-bit vector Base address



● Principle of an access vector



consider the way the QL interprets the significance of a byte depending on where it is located in memory. In the ROM a byte might represent a machine code instruction, or an ASCII character in an error message, or be part of a symbol shape in the character font. In RAM it might represent a sequence of pixels in the screen area, the location of a file in the Microdrive map, a border colour in a channel block, part of a string in the variables area, or a reserved keyword in the SuperBasic program area. If the interpreter was not aware precisely of a byte's location the significance of its value would be lost. Such navigation errors on the part of the interpreter are a fairly common cause of system crashes.

Although a byte is the basic computer data store, SuperBasic users are more accustomed to considering variables as the irreducible minimum for data storage. When large amounts of simi-

lar related information needs to be stored, SuperBasic allows programmers to declare arrays of any variable type. The principles of data storage discussed apply equally to data held in SuperBasic arrays and data held in raw bytes, although the latter method usually uses memory more efficiently.

Variable name

Conceptually, a series of bytes and a single-dimension integer array are very similar. A variable name is merely a convenient way for a programmer to refer to a memory location, or more properly a series of locations, which store a particular value.

The relationship between locations is frequently more important than their position. That a byte is at memory address 524567 might not be so relevant as the fact that it is the fifth byte in a particular series. That

is because many groups of information, or *data sets*, have natural sequential arrangements and computer data structures are most successful when they mirror the natural patterns of the information they are holding.

Names can be arranged alphabetically, values can be arranged in ascending or descending order, data can be recorded in the order in which it was entered or the order in which it will be used, and so on.

A computer data structure needs to store the elements of a sequential data set in an appropriate order to imply the links between them. Sometimes the links are more complex and need to be included explicitly in the data structure. This month's article, though, is devoted to storage structures where a sequence is implied by the position of the elements within a data set.

The simplest form of data structure is called a *vector*.

It consists of a fixed number of similar values arranged in a single dimension; it is also known as a one-dimensional array. A vector can be created by reserving an area of memory equal to the size of a single entry *size* multiplied by the number of entries required.

The start of the *n*th entry is found by calculating $n-1 \times \text{size}$. This is known as a *mapping function* or an *access algorithm* depending on whether it is used to add information to a vector or to find information within it. Figure one shows the concept of a vector.

Counterparts

Some of the algorithms shown in the text have been simplified to emphasise their essential characteristics. Because of factors such as the existence of zero elements and the need for data to occupy more than one byte of memory per element, the true algorithms can look more complicated than their pseudo-code counterparts. A number of working listings have also been included to demonstrate how the pseudo-code algorithms can be translated into SuperBasic.

If any of the three essential criteria of a vector are not met problems may arise from using a sequential storage structure and it might be worthwhile investigating some other means of holding the data. Where data naturally occupies more than one dimension, multi-dimensional structures need to be devised. That does not mean, however, that the value of each element in a vector is limited to a single number.

Perhaps the most common example of a vector is a grid reference — cf the AT statement — which has two components. These would be stored in a vector as two successive bytes, the first relating to the X axis and the second to the Y axis, and the two bytes together are considered as an indivisible whole.

All the values held in a

Figure 1

```
100 REMARK : ESTABLISH A VECTOR
105 :
110 Elements = 200: REMARK : No of elements
115 Size = 4 : REMARK : Bytes per element
120 :
125 Base = RESPR (Size * Elements)
130 :
135 REMARK : WARNING: The reserved area might
    contain spurious values, so do not
    assume that unused bytes equal 0
140 :
145 REMARK : Example calls
150 :
155 POKE_L Locate (12), 586
160 PRINT PEEK_L (Locate (12) )
165 :
170 DEFINE Function Locate (Target)
175 RETURN Base + (Target - 1) * Size
180 END Define Locate
```

Figure 2

```
200 REMARK : 3D INTEGER ARRAY
205 REMARK Establish dimensions & reserve memory
210 :
215 Max_X = 7: Max_Y = 9: Max_Z = 6
220 Base = RESPR (Size * Max_X * Max_Y * Max_Z)
225 :
230 REMARK : Locate value (2, 7, 4)
235 :
240 POKE_L Locate_3D (2, 7, 4), 513
245 Value = PEEK_L (Locate_3D (2, 7, 4))
250 PRINT Value
255 :
260 DEFINE Function Locate_3D (X, Y, Z)
265 RETURN Base + ( (Z * Max_Y) + (Y * Max_X) + X
    ) * Size - Size
270 END Define Locate_3D
```

vector must be identical in type and occupy an equal number of bytes. In other words, strings and numbers cannot be intermixed and, particularly where strings are concerned, elements must all be the same length, otherwise the access algorithm breaks down. Fortunately, both real numbers and integers can be limited to a fixed number of bytes whatever their value.

Although values in a vector can change by being over-written, it is rarely convenient to insert new values. That would involve shunting down succeeding values and thus corrupting the access algorithm. Similarly, it is unlikely that adding new values continually to the end of a vector would be acceptable because they may not be properly ordered and there may not be room reserved for them.

Such inflexibility is a hallmark of static data structures — it is, in fact, what is static about them — but ulti-

mately even dynamic structures such as linked lists are of finite length; inflexibility is not always an unacceptable disadvantage.

Extra Dimensions

The logical improvement to a vector is to add extra dimensions, although by doing so the term vector becomes inappropriate and the data structure is now termed an *array*. In SuperBasic, arrays are always rectilinear — a two-dimensional array looks like a rectangle, a three-dimensional array is like a cube — and can therefore be said to be composed of a number of individual vectors stacked together. The mapping functions for such arrays are very easy to establish; a vector can be doubled in length, say, by reserving memory with the formula:

$$\text{base} = \text{RESPR} (\text{size} * \text{elements} * 2)$$

The access algorithm to locate, for instance, the

third value in the second vector becomes:

$$(2 * \text{size} * \text{elements}) + (3 * \text{size})$$

The brackets are included for emphasis. In a two-dimensional array with dimensions *max-Y*, *max-X* the access algorithm to find a location represented by the co-ordinates *Ypos*, *Xpos* would read:

$$(\text{Ypos} * \text{max-X}) + \text{Xpos}$$

If an additional dimension were to be added of *max-Z* elements, the formula becomes:

$$(\text{Zpos} * \text{max-Y}) + (\text{Ypos} * \text{max-X}) + \text{Xpos}$$

The pattern could be extended to cater for any number of dimensions.

Not all data sets fit neatly into a rectilinear mould. A mileage chart provides familiar evidence of this. It is typically a number of towns listed both vertically and horizontally with a triangular set of boxes in which the distance between each pair of towns is recorded. A square mileage chart is possible but the upper right portion of the chart would be equal to the lower left portion because a feature of our road system is that the distance from Aberdeen to Winchester is the same as the distance from Winchester to Aberdeen.

SuperBasic is of no assistance when non-rectilinear arrays are required because vectors within an array must be the same length. Space for a triangular array which for convenience allocates only one byte for each distance could be established using the following formula:

$$\text{base} = \text{RESPR} (\text{towns} 2 / 2)$$

The variable *base* would then hold the start address of the reserved area of memory. Towns would be arranged in alphabetical order in a string array, their location within it identifying where in the triangular mileage array the relevant distances lay. The distance between the fourth town, Bradford, and the fifteenth town, Leeds, for instance, would be stored as the fourth element of the fif-



teenth array at location:

$base + (15 * 15/2 + 15/2) + 4$

The part of the algorithm in brackets calculates the location of the first datum relating to Leeds. It is based on the familiar formula for finding the area of a triangle – half the base times the height – converted to represent bytes rather than units of area. The general algorithm to disclose a location (X,Y) is:

$X * X/2 + X/2 + Y$

The value for Y must always be less than the value for X. It is interesting and convenient that the result of the expression is always an integer.

Another useful non-rectilinear array structure is the regular, or balanced, *binary tree*. A binary tree begins at the top with a single node which has two daughter nodes, each of which has two successors, and so on, until the lowest level of the tree is reached where the nodes have no daughters. A path through the tree can be traced using boolean logic – “true, false” or “left, right” or “0,1” and so on. A binary tree with X levels must have $x-1$ locations and a mapping function is relatively simple. The value located at the fourth node on the seventh level could be found by calculating:

$7 * 2 + 4$

In general, to locate element E on level L of a binary tree the mapping function is:

$base + L * 2 + E$

Binary trees are not always regular; many nodes might be missing and there may be more levels in one part of a tree than in another part. The simplicity of regular binary trees makes

them worthwhile structures even when many of their nodes do not exist.

It would also be possible to create arrays with logarithmic dimensions, or based on a natural distribution frequency, or by using mapping functions of almost any complexity, but if such unusual arrangements of data were being handled it would be better to use non-sequential data structures.

A problem sometimes encountered is how to represent arrays consisting mostly of randomly-distributed zero elements without wasting memory. Such arrays, called *sparse arrays* or *sparse matrices*, can occur in networking and engineering problems. Zero elements typically would represent above 70 percent of the data before alternative forms of holding the information become worthwhile.

One method is to construct a bit-map to indicate where non-zero elements exist. The non-zero elements could then be stored sequentially in a vector. The access algorithm for the vector would depend on the number of ones which preceded the current location in the bit-map. A matrix of single-byte integers with 32×32 locations stored conventionally would occupy 1,024 bytes.

A bit-map of the same matrix would occupy only 16 bytes and if 200 of the locations held non-zero values a vector of 200 bytes would be required, leading to a total saving of 808 bytes. Space taken by the access functions must also be taken into account but large arrays can conveniently be compressed in this way.

Another solution might be to store values alongside their location co-ordinates in a small array – e.g., DIM Array% (200, 3) using the foregoing example. The access algorithm would involve looking at a location chosen by a rough guess and then searching round that location until the target value was found.

The methods of storing

Listing 3

```
300 REMark : Establish large data string
      with integer array as access vector
305 :
310 Store% = FILL$ (" ", 1000)
315 DIM Vector% (200)
320 :
325 REMark : Hold "next free vector" in variable
330 :
335 Next_V = 1: Vector% (1) = 1
340 :
345 DEFINE PROCEDURE Add_Datum (Info%)
350 LOCAL Start, Finish
355 Start = Vector% (Next_V)
360 Finish = Start + LEN (Info%) - 1
365 IF Finish > LEN (Store%): STOP
370 Store% (Start TO Finish) = Info%
375 Next_V = Next_V + 1
380 Vector% (Next_V) = Finish + 1
385 END DEFINE Add_Datum
```

Listing 4

```
400 DEFINE FUNCTION Fetch_Datum% (Target)
405 RETURN Store% (Vector% (Target) TO Vector%
      (Target+1) - 1)
410 END DEFINE Fetch_Datum%
415 :
420 REMark : Example Calls
425 :
430 Add_Datum "Piece of Data"
435 :
440 PRINT Fetch_Datum% (1)
445 STOP
```

sparse matrices cannot cope easily with situations where values change from zero to non-zero, therefore fixed-length sequential storage structures must be abandoned and a solution found elsewhere.

Longest datum

Data is rarely in identically-sized or neatly-organised packets and therefore all the vector elements must either be equal in length to the longest datum, which can waste an unacceptable amount of memory, or the data must be stored in a different fashion.

To preserve some of the advantages offered by vectors, irregular data can be stored sequentially in one array and an auxiliary vector established to hold the address of the first byte of each datum. Such address pointers fulfil all the criteria of a true vector – they are of a single dimension, they are homogenous in type and length and they can be fixed in number.

Figure two demonstrates diagrammatically how the two structures relate to each other. The additional overhead is typically two bytes per element and there is also a penalty in the extra access time required to retrieve a particular datum but those disadvantages

may well be more acceptable than those of alternative solutions to the problem.

Auxiliary vectors, also called *access vectors* or *Iliffe vectors*, also offer advantages when string arrays have to be sorted. Because it takes time to shift large string array elements round in memory it is quicker to keep the string array in the order in which it was entered and add an access vector which can be sorted to point to the string array elements in their alphabetical order.

The next logical step is to combine the auxiliary vector and the data array into a single area of memory, so that each entry includes the address of its successor. Such structures, called *linked lists*, will be the subject of a later SuperBasic feature.

SuperBasic arrays are easy to understand, establish and use but for many applications they are not ideally-suited to the task in hand. By developing other static, sequential, data structures memory can be saved and, occasionally, access times can be reduced. These two advantages are often incompatible; memory is saved at the expense of increased access time and access times are reduced by compressing the data.

NOW WE'RE GIVING IT AWAY!

★ Up to £39.95 off Pascal, Pro-Monitor, Monitor or Task Swopper ★

QL EXPERT

£49.95

NEW

This is a tool enabling professional and novice to produce artificial intelligence based expert systems on a 128K QL. Main features:

- Boolean, Puzzy and custom probabilities
- Multiple goal paths
- Fast/clever evaluation
- On-line help
- Efficient rule storage
- Formatted output
- Trace, How, Why, What-if

MEGA-TOOLBOX

£29.95

NEW

Adds 170+ commands to basic, mostly unique. Demo cartridge only £5 (redeemable on purchase).

- Multi-tasking input, recolour, scroll, tunes, banner
- Window save, hide, zoom, copy, compress
- Mix high/low res. graphics on same screen
- Access to pipes, QDOS/basic variables, traps
- Compatible with Supercharge, Turbo, etc

QL PASCAL

£39.95

£25!!

A full featured Pascal compiler that exceeds the ISO standard with many extensions

- Super-fast
- Simple to use
- Efficient
- Professional

TASK SWOPPER

£19.95

£15!!

Multi-tasking in only 10K. Even on a 128K QL.

- True multitasking of Quill, Archive, Abacus etc
- Access to basic, editors etc
- Printer driver menu
- True job cloning
- Background printing

PRO MONITOR

£39.95

£30!!

NEW

The most powerful QL debugger. Features as Monitor, plus built-in single/multi line assembler and symbolic debugging. 18 new commands. No other monitor comes close to this spec. (Return old Monitor cartridge and £20 to upgrade.)

MONITOR

£19.95

£15!!

Powerful, full featured assembly debugger.

- Memory dump/modify
- Trace/breakpoint ROM/RAM
- Reg modify/display
- Job control + more

QL FORTH

£39.95

Professional Forth-83 compiler.

- Fast+compact
- Many extensions

ASSEMBLER

£29.95

The fastest QL 68000 assembler.

- Screen editor
- Linker

TYPING

£14.95

£10!!

Professional tuition in easy steps.

- Speed and accuracy measured

COPYCAT

£10.99

Back-ups those protected cartridges in no time.

BOOT 128K

£5.99

Run "128K only" programs in your expanded QL.

1 to 1 DUMP

£5.99!!

Undistorted screen dump for Epson FX80 printer.

MULTI-PRINT

£5.99

Print multiple copies of files with this multitasking program.

MDV TOOLKIT

£9.99

Basic extensions to read/write mdv sectors, headers etc.

ALMDV TOOLKIT

£19.95

1000 lines of 68000 source code for mdv header and sector access.

HARD BARGAINS (Spend over £50 and get up to £39.95 off selected software: See below)

Sinclair QL (JM)	£119.00	Astracom 1000 app. modem	£149.00	4 mdvs in wallet	£7.50
Trump card (768K + disc i/f)	£189.00	Miracle modem	£49.00	10 new mdvs (loose)	£18.00
512K Expanderam	£90.00	Parallel printer i/f	£20.00	10 used mdvs (loose)	£15.00
Cumana disc interface	£79.00	Serial printer cable	£15.00	20 new mdvs in box	£39.00
Single 3.5" disc drive	£139.00	Parallel printer cable	£15.00	20 used mdvs in box	£29.00
Dual 3.5" disc drive	£219.00	QL ROM cartridge	£10.00	Mdv storage box	£5.00
CUB 14" monitor + plynth	£279.00	27128 (16K x 8)	£6.00	Ten 3.5" discs	£29.00
One way mains filter	£14.00			40 disc box (lockable)	£14.00
Four way mains filter	£18.00			80 disc box (lockable)	£18.00

VAT INCLUSIVE

**PRICES INCLUDE VAT AND DELIVERY
DEALER AND EXPORT ENQUIRIES WELCOME**

**FREE
SOFT-
WARE**

Give away offers: Spend over £50 and get up to £39.95 off the following: QL Pascal, Pro-Monitor, Monitor or Task Swopper.

Spend £50.00 and get **£5.00 off**

Spend £150.00 and get **£15.00 off**

Spend £100 and get **£10.00 off**

Spend £200 and get **£25.00 off**

... any of Pascal, Pro-Monitor, Monitor or Task Swopper.

e.g. Buy Trump Card and mains filter for £203 and get Pascal FREE (normally £39.95)

(Note: Give away offers and price reductions shown apply for limited period only.)

COMPWARE

**Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA
Tel: (0270) 582301 (Telex: 265871 quoting MAG70076)**

A criticism levelled frequently at the Sinclair QL is that despite its 7.5Mhz CPU it is, in fact, a slow computer. With its tardy SuperBasic tokenising process, slow program interpretation, leisurely Psion applications and snail-like screen-handling it is not difficult to find justification for the criticism.

So far the solutions have been program-specific. SuperBasic compilers or other compiled languages are in widespread use and applications have been re-written or patched or replaced by faster but simpler alternatives.

Close study of the voluminous Turbo compiler documentation reveals that its author, Simon Goodwin, has been developing a radical solution to the fundamental problem of slow screen-handling. The finished article is the Creative CodeWorks recently-launched *SpeedScreen* which accelerates screen printing by up to 12 times. As a result, applications as diverse as Quill, Abacus, QRAM, Front Page and the SuperBasic editing environment have been given new life.

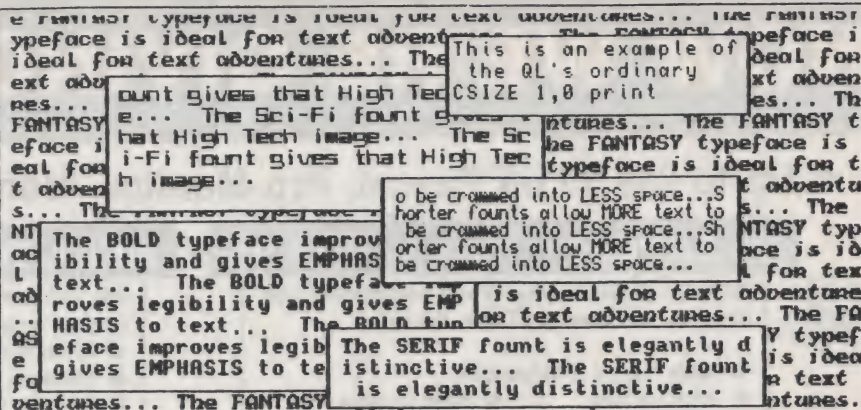
CST has already announced that SpeedScreen will appear on future Thor computers with upgrades being offered to current Thor owners. Other licensing deals are in the offing and a limited variation of SpeedScreen is being licensed to software houses. SpeedScreen will be very popular indeed.

The exceptional feature of SpeedScreen is that it is a generic fix for an all-pervasive problem rather than an improvement to a specific program. It is fully-compatible with Qdos and all other programs, it is completely transparent to the user, it works in all windows, including temporary Qdos windows, it requires no special computing ability or knowledge and it imposes no limitations on the user.

Prints fast

SpeedScreen prints text in either CSIZE 0,0 or CSIZE 1,0 at least three times as fast and typically around six times as fast as normal. Window scrolling can be accelerated under user control and both cursor and CLS operations have benefitted from Creative CodeWork attention. The fix also removes the annoying flicker which appears occasionally when printing blocks or scrolling windows.

The size of the QL 32K screen map limits SpeedScreen default scrolling speed to about twice as fast as normal but SpeedScreen circumvents this restriction by allowing the user to



"Speedscreen will be very popular indeed."

Mike Lloyd reviews a well-thought-out, thoroughly tested, easy-to-use and sensibly-priced product.

Fast and

specify by how many lines the screen should be scrolled when the bottom of a window is reached.

The command -SCROLL 2, for instance, scrolls twice as far and half as often. Larger parameters are less smooth but the speed increase is dramatic. With a modest setting of -SCROLL 4 a 16K file can be copied from disc to screen in 10 seconds instead of the more normal 49 seconds.

SpeedScreen frees programmers from the limitations of the CSIZE command by allowing text sizes to be altered in steps of one pixel. Fonts based on grids of up to 8x9 pixels can be used rather than the 5x9 grid of the ROM font. Shorter characters allow more lines to be printed in a window but with some loss of legibility.

More usefully, the QL can now display conventional 8x8 fonts and its Mode 4 characters can be replaced by something more legible to TV users. The SpeedScreen package includes a variety of new fonts and an advanced character designer similar to the QLUDGE utility bundled with Turbo Toolkit. It is reasonably easy to use and the extra pixels certainly allowed the imagination more scope but the manic flashing cursor became irritating and users may prefer to write their own character designer.

Despite its power, SpeedScreen is not a cure-all and it is not without its

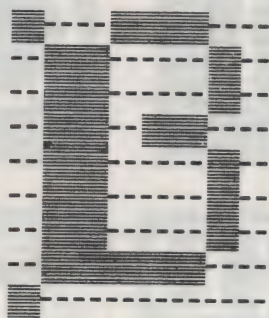
quirks. Mode 8 printing, most of the stipple patterns and all of the graphics commands are unaffected by it, although no restrictions are imposed on their use alongside accelerated characters. Underlining in non-standard character widths is disjointed but the cure would slow SpeedScreen too much to make the fix worthwhile.

Improvement

Active windows and borders are not re-drawn following mode changes but this is more of an improvement than a quirk. A few minor niggles tend to creep in when more advanced SpeedScreen features are used but they would be met only by programmers well able to cope with them.

Some programs benefit more than others from the SpeedScreen environment, due more to the way they were written than to any limitations of SpeedScreen. Quill and Abacus, not noted for the priority they place on screen updating, are greatly improved; page re-drawing is much less pedestrian, operations like COPY and ERASE work quickly and the Quill over-write mode becomes almost as fast as insert mode. Keeping SpeedScreen compatible with all other software has been an uphill struggle but Creative CodeWorks believes that the vast majority of possi-

QDOS characters use columns 2-6
SpeedScreen supports columns 1-6
FAT FOUNT supports all 8 columns



CHRS
(66)

Press ENTER to store design, ESC to abort.

"... a handful of fonts complete the package."

friendly

ble clashes have been identified and averted. A minor but unavoidable quirk is that SpeedScreen must be loaded before QRAM.

The SuperBasic editing environment is more responsive because of the speed with which Window#2 is updated. Most impressive, though, is the way screenfuls of more than 1,000 characters can be printed almost instantaneously. SpeedScreen puts the QL into the same class as the BBC Micro for screen printing. For readers unfamiliar with the BBC, SpeedScreen literally has to be seen to be believed.

When developing SpeedScreen, the main target for Goodwin's attention was the slothful Qdos printing routine which handles all screen text, no matter what CSIZES, character designs, window shapes, border thicknesses and colour combinations are used. Its sluggishness is due to its generality; therefore the obvious cure was to trade compactness for speed and replace it with no fewer than 22 smaller routines, each handling specific printing options. The characters printed most frequently are spaces, so SpeedScreen includes a dedicated super-fast routine for printing spaces.

SpeedScreen handles each line of print as an entity, calculating all the character positions before printing starts. The Qdos code, on the other hand, is forced by its ubiquity to cal-

culate each character position individually. Even though SpeedScreen has to choose the most appropriate of its 22 routines and carry-out a series of preparatory calculations, it is still faster off the mark than the QL native printing routine. When printing begins the speed increase is phenomenal.

The fastest SpeedScreen routine works with white ink on black paper. Slightly slower routines cope with other colours and with the vertically-striped stipples. Because other stipples involve repeated changes to the printing masks they are passed to the ROM printing routine but SpeedScreen handles all UNDER and OVER options.

The calculations for locating CSIZE 1.0 characters are greatly simplified because their eight-pixel width exactly fits two bytes of the screen map. This is especially advantageous when characters begin on a word boundary in the RAM screen image. Under those conditions, even Qdos manages to improve its printing rate by some 29 percent but SpeedScreen offers an incredible 1,200 percent increase compared to the Qdos code printing "off-grid".

Representative timings are like car performance figures, that is their relevance is limited. Anyone expecting Quill to run 12 times faster, for instance, probably thinks an Austin Metro will return 75 miles per gallon

on shopping trips. Without making special arrangements to take advantage of the fastest SpeedScreen options, users can expect printing to be around four times faster on unexpanded QLs and six times faster if a memory expansion is fitted or the EPROM version of SpeedScreen is used. Carefully-chosen window positions, CSIZES and colour options will ensure the twelvefold speed increase promised by Creative Codeworks.

Simple living

Living with SpeedScreen is simple even for QL owners who know nothing about SuperBasic because it has been designed to be unobtrusive and completely compatible with everything else which runs on a QL. It can be installed as an extension alongside toolkits, front-ends and the like and then forgotten unless users wish to take advantage of the extra fonts, character sizes and scrolling options. It is very easy to take SpeedScreen for granted but omitting it accidentally from the boot sequence offers a painful reminder of what the QL used to be.

The SpeedScreen package contains a group of nine variants of the Basic code which occupy between 4.5K and 16K of memory space. Options include cut-down versions for unexpanded QLs and an extended variant to cope with very wide fonts. A comprehensive handbook, a configuration utility, a character designer and a handful of fonts complete the package.

SpeedScreen does everything Creative CodeWorks claims it does and it is practically vice-free. The package is well-thought-out, thoroughly tested, easy-to-use and sensibly priced. It has the advantage of enhancing almost every piece of software available and it does so without imposing restrictions and without requiring any computer literacy from the user. Goodwin is promising something else fast and friendly after the New Year but he may find that meeting the demand for SpeedScreen will be diverting his attention for some time.

Product: SpeedScreen

From: Creative CodeWorks,
PO Box 1095,
Birmingham
B17 0EJ

For more information send SAE, or place order with cheque/PO.

Price: £20 for disc or Microdrive version,
£30 for EPROM.

SECTOR

SPELLBOUND

REAL TIME spelling checker for Quill or The Editor V1.17 onwards on the expanded Sinclair QL.

Spell Bound checks input by the character against its 30,000+ word dictionary. It has 5 switchable modes of operation to suit a variety of typing styles with the dictionary available at all times. Spell Bound displays example words on request and operates with no discernable reduction in the operating speed of Quill. The dictionary is fully user expandable to memory/media limits.

Available on disc or Microdrive at only £29.95

SOFTWARE 1

Touch Typist	£12.00
Task Master	£25.00
Spellbound	£29.95
Turbo Quill+	£14.00
Turbo Quill	£12.00
Cartridge Doctor	£13.00
Eye Q	£29.00
Turbo	£99.00
The Editor (DP)	£30.00
Project Planner	£30.00
Forth	£34.00

SOFTWARE 2

Toolkit 2 (EPROM)	£34.00
TechniQL	£49.00
Media Manager	£40.00
Front Page	£23.00
Scrabble	£15.00
Keydefine	£10.00
Talent Workbench	£25.00
Supercharge	£49.00
Psion Chess	£17.00
Better Basic (DP)	£20.00
Home Finance	£20.00

FLASHBACK

See opposite for details

TASKMASTER

THE ULTIMATE

- **NOT JUST** another multi tasking program, but a complete front end memory management system for the expanded Sinclair QL.
 - **ON SCREEN CALCULATOR** with many features including delta percentage mark up.
 - **POWERFUL FILE MAINTENANCE** of discs and Microdrives.
 - **NOTEPAD** with word wrap and 'send note' feature.
 - **SOFTWARE RESET** scans for, and warns of any vulnerable open files at close down.
 - **SERIAL PRINTER BUFFER** user configurable up to 32K
 - **DUPLICATE CODE SHARING** allows multiple copies of the same program without losing memory to additional code space e.g. 12 copies of Abacus with 230K free.
 - **COMMAND FILE MODULE** easily creates files which will operate the machine in your absence. For example it could load quill, fill in your address, type a standard letter and print it. You will, however, have to post it yourself.
 - **TASKMASTER** does not consume vast amounts of memory. If you wish only to use the multi tasking module, that is all you need to load, thus using only a small slice of memory. The choice is always yours
 - **USER FRIENDLY.** It was described as "virtually idiot proof" by a major software reviewer.
- Available on disc or Microdrive and still only £25**

CAMBRIDGE COMPUTERS Z88

-from Sir Clive Sinclair

£287

- Built in screen
- Full size keyboard
- Built in word processor
- spreadsheet and database
- 32K RAM
- Diary and Calculator
- Comms software
- All Z88 accessories available
- Runs for 20 hrs on 4 AA batteries
- Many more features

QZ

**QL-Z88 file transfer software
£15 (QL-Z88 cable - £8)**

Allows you to use the QL for storage and editing of files, or to use the Z88 as a portable data terminal. Available on 3.5in. disc or Microdrive

SOFTWARE

**NEW FROM
SECTOR
SOFTWARE**

FLASHBACK

FLASHBACK

An entirely new concept in fast information storage, retrieval and manipulation on the Sinclair QL. Flashback is written by Peter J Jefferies, author of Taskmaster and Spellbound and is designed to be user-friendly, powerful, flexible and very fast.

The master program is memory based and will operate in different forms, dependant on whether running on a standard or expanded machine. Easily build your own reference system from scratch or import existing Quill list files, Archive export files, Editor text files and even Superbasic program listings.

FLASHBACK

FLASHBACK

Uses infinitely variable non-destructive windows and is designed to overlay the current program when required. Built-in text editing, free-form structure supporting, varied selecting, sorting and location features.

Available from December 12th 1987.

Try & buy at the Microfair.

See us on the stand with the crowd around it!

ONLY £25

TOUCH TYPIST

Don't even think about buying a replacement keyboard until you know how to use the one you already have.

Why type slowly when you can be typing at professional speeds? Touch Typist is the fastest typing tutor available for the Sinclair QL. It will teach you to type at up to 211 wpm. It is 100% machine code and has:

- 3 teaching modes ● adjustable speed and accuracy targets
- very fast interactive keyboard ● results display graphs

Customise any or all of the 200 lessons which can then be saved to create a library of custom lesson sets. Touch typist will run from disc, Microdrive or ramdisc. Available on disc or Microdrive for only £12.

"Succeeding admirably as a serious course intended for beginners and experienced typists alike...includes the professional polish of good quality software" - QL World

**39 WRAY CRESCENT, ULNES WALTON,
LEYLAND, LANCs PR5 3NA**

Tel: 0772 454328, Prestel mailbox 772454328

ALL PRICES INCLUDE VAT AND P & P



QL SPARES

Service Manual - This is the most up to date book for repairing the QL. It contains all circuit diagrams, faultfinding charts and oscilloscope displays to enable you to repair your own QL or understand how it works - **£25.00**

QL Test Software - Including RS232 loopback lead. Tests all major functions of the computer - sound, colour, keys, RS232, Micro-drive etc. Used by repair companies - **£14.00**

Keyboard membrane	£6.00
Bubble mat	£3.00
JS ROM set	£28.00
ZX8301 ULA	£12.00
ZX8302 ULA	£13.00

VARIOUS

Trump Card	£195.00
QL dustcover	£5.00
Microdrive labels on tractor feed per 100	£3.50
20 Microdrives in Transform storage box	£39.00
Internal 640K memory upgrade	£99.00
Miracle autodial modem	£45.00
Astracom 1000 modem	£199.00
Microvitec 1451DQ3 dedicated monitor	£260.00
Parallel printer interface	£19.50

QUANTUM COMPUTING PRESENTS

QMONIX CODE SOFTWARE

Item #	Name	Price
# U01	Cloney The Copycat	£10.00
# U17	*Qmonix File Manager	£14.00
# B10	*Qmonix Address Book	£14.00
# B11	Qmonix Checkbook Manager	£19.00
# S01	Qmonix Keyboard Drill Sergeant	£10.00
# S06	*QL Kitchen Aid	£14.00
# S07	*Qmonix Computer Chef	£14.00
# G05	*QL Tabletop Draw Poker	£10.00
# C08	*Qmonix 300 Baud Conference	£15.00
	Multi-Window Terminal Program	

Gridland-Holocast **£9.00**

(nuclear war simulation game)

Now you can conduct your very own multi player nuclear war simulation.
Right within the privacy of your own home.

Q-CAL!

Memory resident pop-up background calendar for the QL.

* Means Programs Require Supertoolkit II Commands

To Order Contact:

In Europe:

HB Computer Sales
Littleton House
Littleton Road Ashford
Middlesex TW15 1UQ
Telephone: Ashford (MX) 0784 248616

In America:

Quantum Computing
Box 1280
Dover, New Jersey 07801 - USA
Telephone: (201) 328-8846



the talisman - is the new role simulation from PCBS.

Your quest is to discover the Talisman - a small golden periapt which protects its wearer from physical and supernatural damage and lies within an underground complex inhabited by a myriad of terrible adversaries.

The Talisman is not a conventional adventure game nor an arcade game; but a combination of both, with elements of strategy and realism. It is unique since the combination is randomly generated each time the game is played - resulting in the unusual situation where the game's author can play it too - incidentally he has yet to find the Talisman!

Throughout the quest you could be confronted by over one hundred different types of creatures - and use over one hundred different magical aids. This, coupled with the intricate game system and random generation facility, means that it can only be played on expanded machines. The game comes with a comprehensive manual detailing magical items, creatures and information on the four character types available.

Finally we must warn you that this game is completely addictive; our playtesters have indulged in all night sessions, only stopping for calls of nature!

No-one has finished the game yet - will you be the first?

The Talisman is THOR compatible, and is available in 3.5 inch disc or on two macro-drives - priced £19.00.

ATTENTION ALL QL ADVENTURERS: CAN YOU BECOME THE HERO OF THE 'PRINCELANDS'?

IN THE ENTHRALLING NEW EPIC

THE HEART OF GERN?

© 1987

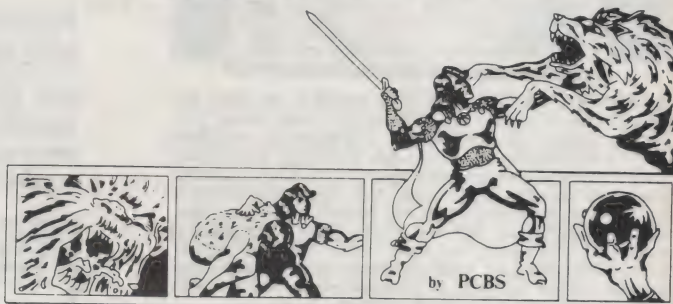
The "Heart of Gern" is the first of a challenging series of adventure games devised to test even the most battle-scarred adventurer. Set in the magical fantasy world of the 'Princelands' you Tira must continue the quest for the black jewel which imprisons

the evil spirit-wolf, Gern. You must reach the Heart before the brotherhood, an evil cult of wolf worshippers whose aim is to release Gern. Hidden away in a secret vault protected by guards, traps and magical deceptions it will take more than luck to succeed, it

will take skill, determination and above all rational thinking.

Will this be the dawn of a new dark age or can the evil brotherhood be thwarted? The fate of the 'Princelands' is in your hands.

Now available in four formats: Microdrive Mode 4 or 8 - £15.50
(Please specify format required) 3.5" Disc Mode 4 or 8 - £17.00



Send your cheque, P/O to: PCBS, Studio 204, Seedhill Office, Paisley PA1 1JN. Please allow 14 days for delivery.

QL TURBOQUILL +

QL Turboquill described as 'absolutely essential' by QL World now has a new even faster version, QL Turboquill+ for expanded memory QL's only. TQ+ drastically improves screen handling by over 100%, this plus the added features of a glossary (keydefine) and capslock indicator turns quill into a slick, fast professional word processor. QL TURBOQUILL+ now compatible with QRAM.

QL Turboquill+ £13.50 inc. VAT pp

QL Turboquill £11.50

Taskmaster £25.00

Spellbound £29.95

QL Turboquill+ and Spellbound £41.50

QL Turboquill+ and Taskmaster £37.00

New product flashback the **RAM**, based on information storage system, ten times faster than the ARCHIVE only **£25.00 INC.**

Please state required on MDV or 3.5 disk.

Also your quill version (ie 2.3 or 2.35). Prices include VAT, postage labels

"DISKS DISKS DISKS"

Quantity	3.5 DS/DD	3.5SS/DD	5.25 DS/DD
10	£11.50	£10.95	£6
30	£32.00	£31.40	£13.80
50	£52.90	£49.90	£21.80
100	£100.05	£94.30	£39.50

Call for the lowest priced quality Discs in the UK. Lifetime guarantee.

Plus a 14 day money back guarantee.
Express same day dispatch 1/10 disks storage box (10disks) £1.50 inc.

Cheque/PO to: Athene Consultants,
33 Holly Grove, Fareham, Hants PO16 7UP.
Credit Card Hot Line No.: Tel: 0329 282083

SEE US AT THE ZX MICROFAIR, 12th DECEMBER

THE PERFECT PRESENT FOR ANY QL — OR EVEN ITS OWNER

SCHÖN KEYBOARDS



SCHÖN PC KEYBOARD: This product has been acclaimed as "the best QL add-on for a long time." As shown above, the SchöN PC Keyboard is supplied with a housing to cover the QL circuitry. Expansion port and M drives are still accessible. The keyboard interface simply plugs into the 8049 co-processor socket. The keyboard itself has 86 full travel keys and include single key left and right delete, illuminated caps and NUM lock, two enter keys, diagonal cursor keys. This product will certainly change your approach to the QL and is guaranteed to benefit you. Full spec sheet available on request.

SCHÖN KEYBOARDS NORTHCOTE CRESCENT, WEST HORSLEY, SURREY KT24 6LX (04865) 3836

Please allow 28 days for delivery. Trade enquiries welcome

SCHÖN STANDARD REPLACEMENT: The most widely sold replacement keyboard for the QL is the basic add-on keyboard. It makes no drastic changes to the QL other than the keys. Expansion port, rear ports and M drives remain unaffected. The 65 keys are all full travel and have two shot plastic symbols. To install – simple screwdriver job, no soldering – 5 minutes. Spec sheet available.

Please send me the following:

SchöN PC Keyboard " £99.95 inc VAT. £2.10 p&p
SchöN Standard QL Keyboard " £54.95 inc VAT. £1.70 p&p
PVC Dustcover for PC Keyboard " £4.95 inc VAT.

Mr/Mrs/Miss _____

Address _____

P. Code _____

Amount enclosed _____

Overseas: Deduct 15% VAT and add £4.00 extra for postal costs. U.S.A., U.A.E. & Australia etc. add extra £12.00 for air mail.

WDSoftware

FOR THE SINCLAIR QL:-

JOSS **£15 on mdv or 5¼" fip, £17 on 3½" fip**

Forget syntax errors and mistyped names in file commands! Just move a cursor and press SPACE. Cursor keys or joystick allow access to up to 8 microdrives and all the discs your interface will handle, with up to 150 files on each. Scroll & print directories, COPY, DELETE or PRINT and file, select TV or Monitor mode before LOADing/RUNning a program. Use keyboard only to set date or label a medium. Easy to use with Psion or other software. No silly icons and to learn – JOSS will tell you what it's doing! Mass copying/printing utilities and programmer's toolkit. Specify disc size, tracks and interface (CST, Cumana, PCML, MicroPeripherals) or microdrive only.

RefQL7 **£11 on 2 mdvs or 1 3½" fip, £9 on 5¼" fip**

For use with ARCHIVE 2, contains 1300 useful references and a search/print program. Find programs, articles and reviews buried in the magazines on your shelf! Cheap updates of earlier editions.

Mdv Extension Cable (8") **£5.50**

Add ZX Microdrives to you QL.

Joystick Adaptor **£4.99**

FOR THE QL, SPECTRUM, (ALL), BBC & ELECTRON:-

WD Morse Tutor **£4 cassette, £6 mdv or 5¼", £8 3½"**

Teach yourself to read Morse Code. From absolute beginning to 18 wpm! Feedback on screen or printer. Random letters, numbers or mixed, 100 random sentences, many helpful features include phonetic speech via Currah Micro-Speech (Spectrum). Discs unsuitable for a BBC B+.

PAYMENT

In advance, in **STERLING** on British bank branches, international Giro, Postal Order or **ACCESS/MasterCard**. Add £1 outside Europe for AIRMAIL.

From now on WDSoftware will be supplying a full range of serious software for the Amiga and S.T.

FROM:-

WDSoftware (ZLW),
Hilltop, St. Mary, Jersey, C.I. Tel: (0534) 81392

A MERRY CHRISTMAS FROM SANDY QL SPECIALS

— NEW — NEW — NEW — QL*MULTI — NEW — NEW — NEW —

**A BRILLIANT NEW DESIGN GIVES THE QL USER
MULTI DISK FORMAT CAPABILITY!**

QL*MULTI has a 3.5" double sided double density 1 mbyte disk drive combined with a 5.25" double sided double density 1 mbyte 80/40 track drive in one small casing with integral super smooth power supply, mains fuse and front panel mounted illuminated power switch — comes complete with cables to plug in and run with any disk interface.

Built to the usual sandy disk drive standards of high quality with innovative design and a one year guarantee — and priced at less than many ordinary disk drives!

— NEW — NEW — NEW — QL*MULTI — NEW — NEW — NEW —

— HARDWARE —

SINCLAIR QL 128K	120.00	TATUNG 12" COLOUR MONITOR	159.00
SINCLAIR QL 640K	199.00	MICRO VITEC DQ3 14" COLOUR MONITOR	£254.00
INTERNAL 512K RAM CARD	85.00	MICRO VITEC MQ3 14" COLOUR MONITOR	£263.00
THRU-CON 512K RAM CARD	90.00	PHILIPS 12" GREEN MONITOR	84.00
SUPERDISK INTERFACE	85.00	SCHON KEYBOARD	54.75
SUPERQBOARD OK RAM	110.00	CITIZEN LSP10 PRINTER	170.00
512K RAM	189.00	PARALLEL PRINTER CABLE	8.50
SQB + MOUSE COMPLETE OK	190.00	10 VERBATIM 3.5" DSDD DISKS	19.50
512K	276.00	25 VERBATIM 3.5" DSDD BULK	34.70
SQB RAM UPGRADE 512K	90.00	50 VERBATIM 3.5" DSDD BULK	66.00
QIMI INTERNAL MOUSE I/F	29.50	MICRODRIVE 4 PACK	6.99
QIMI + QRAM	54.50	MICRODRIVES 10 BULK	16.65
QIMI + MOUSE	68.00	QEP III EPROM PROGRAMMER	125.00
QIMI + MOUSE + QRAM	88.00	QEP EPROM CARTRIDGE	5.99
NEC SINGLE 3.5 DISK DRIVE	125.00	MOUSE MAT ANTI/STATIC	8.50
NEC DUAL 3.5 DISK DRIVE	190.00	QL DUST COVER	5.00
MITSUBISHI SINGLE	100.00	MDV STORAGE BOX	5.00
BARE NEC 3.5 DSDD DRIVE	80.00	QL POWER SUPPLY	25.00
BARE MITSUBISHI 3.5 DSDD DRIVE	60.00	QL JOYSTIC	6.99
QLMULTI 3.5/5.25 COMBINED DRIVE	209.00	40 x 3.5 LOCKABLE DISK BOX	12.00
SERIAL PORT CABLES	4.50	— SOFTWARE —	
SERIAL PRINTER CABLES		GRAM FROM QJUMP	29.90
JOYSTICK PORT CABLES	5.50	QL : CP-M EMULATOR	44.95
MONITOR CABLES		RAM DISK	7.50
PHILIPS 8833 14" COLOUR MONITOR	276.00	SPEED SCREEN	20.00

★ ★ QL SPARES AND KEYBOARD MEMBRANES ALWAYS IN STOCK ★ ★

SPECIAL OFFER — SUPERDISK INTERFACE + SINGLE DISK DRIVE ONLY £180.00

SANDY (UK) PCP LTD

Unit 33, Murdock Road, Manton Lane, Bedford MK41 7PQ

Tel: (0234) 219814 Fax: (0234) 270133

VISA

Prices include VAT & carriage
Export Enquiries Welcome



TO ALL QL READERS!

Welcome to our new FOCUS SALESPPOINT where each month we intend to bring you up to date special offers on high quality products for your computer, your office and YOU at the best possible prices.

PRIZE IDEAS

This is YOUR Focus Salespoint, so if you have any ideas about the kind of product you would like to see offered on these pages please let us know! Just pop a note into the envelope with your order form. There's a special prize for the best idea!

QL GOLD MEMBERS

Keep a close watch. There will be something special for you starting THIS MONTH with a XMAS DRAW. ALL GOLD Members ordering from this month's coupon will be entered into a free draw. The winner will receive a bumper bundle of QL goodies worth £100! Don't forget to fill in your GOLD number. The competition closes 15th January and the winner's name will be published in the next available issue.

MERRY CHRISTMAS FROM ALL AT QL WORLD!

AT LAST! £6.50 THE QL SOFTWARE DIRECTORY FROM D.J.W.

In response to hundreds of enquiries from Britain and Overseas, there is now a definitive list of all the QL Software on the market and names and addresses of where you can buy it.

QL World, in conjunction with D.J.W. are offering this list on a microdrive containing quill files. There is also an update service available so that every so often you can send your old microdrive to D.J.W. and swop is for a brand new updated one. The price includes post & packing.

1.2 KEYBOARD CONTROLLER CHIP

Complete with full instructions, easy to fit, this little chip gets rid of the annoyance caused by "roll over effect" which means that when you accidentally touch an adjacent key, your target letter prints twice. If you have found this a problem in the past, then the keyboard controller chip is just what you need.
£7.50 (including post & packing)

STRESS FREE FROM A. M. T.

This month we bring you three handy attachments for your QL from A.M.T. All three have attributes in common. They are all simple and all designed to make life easier, which can't be bad!

THE THINGI (rrp £7.95) - creates working space out of thin air!

A scientifically designed copy holder which will take single sheets or bulky documents and is completely adjustable to suit your needs. The THINGI can improve accuracy and typing speed dramatically and virtually eliminates stiff necks and eye strain. Velcro fastenings make it easy to attach and remove and it virtually indestructible in normal use.

Special Readers' Price only £5.95

TRIPLE-S (rrp £19.95) - stops your print-outs getting in a tangle!

A universal device that **STORES** listing paper, **SEPARATES** the incoming and outgoing paper, avoiding those annoying tangles, then **STACKS** the finished print-outs. Especially useful for long print runs which can be undertaken with the minimum of attention **TRIPLE-S** is a totally new invention made of sturdy 3mm perspex.

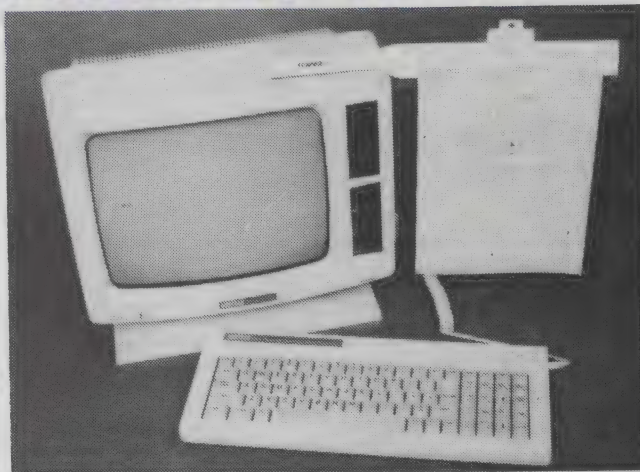
Special Readers' Price only £15.95

THE PLONKER BOX (rrp £4.99 - holds your working discs while not in use.

This little box will stick anywhere on your computer or wall and holds up to four discs at once so you don't have to scabble around looking for them!

Special Readers' Price only £2.99.

OVERSEAS READERS ADD £1.00 extra for postage.



PDQL Combinations

Each of the following programs work beautifully together and we are offering readers a chance to buy any TWO at a special price.



PLUS XMAS SPECIAL - DOMINATION the ultimate in Strategy Games - an addictive test of your economic and military skills for up to four players any or all of whom can be the computer. Special Xmas price £9 including P&P.

COMPARE scans 2 files displayed one above the other and highlights all differences. The unique magic panel allows you to realign and continue.

PDQL-COPY the most versatile copying program on the QL scene, provides instant reports to screen or printer on comparative sizes and copy dates from two discs or cartridges as well as other features.

X-REF is indispensable when writing large programs. Provides a full cross reference index of all keywords from your super-basic program and identifies problems caused by mis-typing, undefined assignment or unassigned definition.

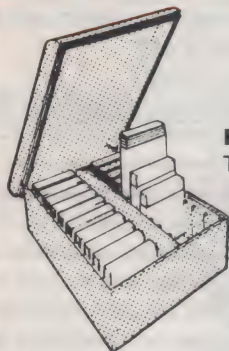
COMPARE / COPY £15

COMPARE / X-REF £19

X-REF / COPY £21

ALL PROGRAMS ARE THOR COMPATIBLE.

QL X-MAS OFFERS

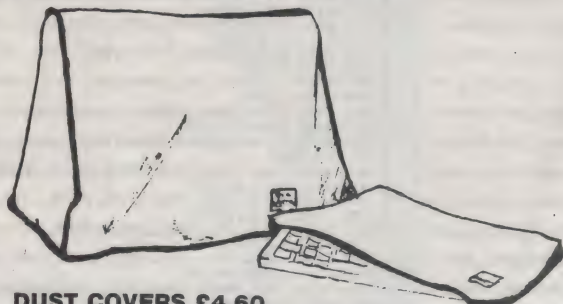


BOX WITH TEN CARTRIDGES £20.
The perfect Xmas Box for QL owners!



GOLDEN OLDIES £10

A compilation of QL games for fun over Xmas. Three games - Meteor Storm, QL Caverns and Diffusion which normally will cost you £24.95.



DUST COVERS £4.60

Fully bound made from high quality silk vinyl.

ORDER FORM QL WORLD (Dec)

Please tick the items you require from the list below and allow 28 days for delivery.

NAME

ADDRESS

Postcode

Keyboard controller	£ 7.50	<input type="checkbox"/>
Software Directory	£ 6.50	<input type="checkbox"/>
Golden Oldies.	£10.00	<input type="checkbox"/>
Cartridge Box	£20.00	<input type="checkbox"/>
QL Dust Covers	£ 4.60	<input type="checkbox"/>
Thingi	£ 7.95	<input type="checkbox"/>
Triple-S	£15.95	<input type="checkbox"/>
Plonker Box	£ 2.99	<input type="checkbox"/>
Compare/Copy	£15.00	<input type="checkbox"/>
Compare/X-Ref	£19.00	<input type="checkbox"/>
X-Ref/Copy	£21.00	<input type="checkbox"/>
Domination	£ 9.00	<input type="checkbox"/>
Subscription (U.K.)	£15.00	<input type="checkbox"/>
Overseas	£30.00	<input type="checkbox"/>

TOTAL ORDER £

Payment is by (please tick)

Cheque Postal Access Visa
☐ ☐ ☐ ☐

Made payable to Focus Magazines Ltd

My credit Card number is

Expiry Date

Send this form together with payment to:

Focus Salespoint
Focus Magazines
Greencoat House
Francis Street
London SW1P 1DG

TELEPHONE ORDERS

01-834 1717

Anne Arnold

If you have a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG. We pay for everything published at the usual page rates — £80 per thousand words.

Program of the month

SPACE PODS by SIMON QUINN

You have been put in charge to protect six fuel pods situated in the centre of the screen. Enemy ships will try to steal the pods and you must stop them by destroying

them. The ships take two hits to destroy but ramming them will kill them, as well as killing yourself.

An energy field surrounds the pods to protect them and you will bounce off it, so be careful. The game ends when

either all your fuel pods have been stolen or you have run out of lives.

To rotate the ship use the left and right arrow keys; to thrust forward use the up arrow key; to stop the ship use the down arrow key and to

fire use the space bar. To play the game, type and run the Basic Loader listing. Then, to play the game, type:

START = RESPR(11600)
LBYTES MDV1-SPACE-
PODS,START
CALL START

```
60 REMARK *****
70 REMARK ***** BASIC LOADER *****
80 REMARK *** WRITTEN BY SIMON QUINN ***
90 REMARK *****

100 CLS
110 RESTORE
120 start=RESPR(11550)
140 add=0
150 FOR a=1000 TO 6760 STEP 10
160 total=0
180 FOR x=1 TO 10
185 READ d
190 POKE W_start+add,d
200 total=total+d
210 add=add+2
220 NEXT x
230 READ check:IF check<>total THEN PRINT "ERROR I
N LINE:";a:STOP
240 NEXT a
250 BYTES mdv1_spacepods,start,11600
1000 DATA 17914,3978,16978,28688,29184,29696,20033
,28711,29184,8316,212682
1010 DATA 1,1,30463,20035,5116,2,1,-32669,28685,29
184,80819
1020 DATA 29696,17402,4136,20035,28704,20035,28685
,29184,29696,17402,224975
1030 DATA 4136,20035,28716,29185,20035,28713,29186
,20035,28717,29187,237945
1040 DATA 29697,20035,10876,0,0,31232,30727,19450,
148,18938,161103
1050 DATA 304,12828,-11707,13340,-27579,30463,2869
5,20035,13432,208,80019
1060 DATA 8781,20114,-9220,0,20,20940,-30,20997,30
77,4,64683
1070 DATA 27598,28713,29191,20035,21317,30727,1945
0,90,18938,246,196305
1080 DATA 12828,-11707,13340,-27579,30463,28695,20
035,13432,208,8781,88496
1090 DATA 20114,-9220,0,20,20940,-30,28713,29188,2
0035,28717,138477
1100 DATA 29186,29696,20035,28716,29184,20035,2918
4,28711,20035,5116,239898
1110 DATA 5,1,-32669,24832,4504,3073,64,26358,2483
2,216,51216
1120 DATA 24576,-228,10,21328,16707,17696,20559,17
491,0,0,118139
1130 DATA 0,0,10,24415,24415,24415,24415,24415,0,0
,122085
1140 DATA 0,0,10,17231,20052,21071,19539,8250,0,0
,86153
1150 DATA 0,0,15,-17219,8224,21071,21569,21573,827
5,18505,82013
1160 DATA 20480,0,10,-16864,8224,21576,21077,21332
0,0,75835
1170 DATA 0,0,18,-16608,8224,21061,22085,21075,176
96,21576,95127
1180 DATA 21077,21332,10,21328,16707,17696,17993,2
1061,0,0,137204
1190 DATA 0,0,18,18505,21536,21328,16707,17696,215
81,8275,125648
1200 DATA 21569,21076,140,10,140,20,60,50,100,80,4
3245
1210 DATA 100,110,100,140,70,170,90,210,19529,2208
5,42604
1220 DATA 21320,18771,17231,21061,21315,20306,1766
4,17914,3516,13500,172598
1230 DATA 3,17914,3510,16978,17914,3506,17042,2918
4,30463,8316,144830
1240 DATA 1,1,27711,20035,28685,29184,29696,17402,
3684,20035,177434
1250 DATA 28704,20035,28685,29191,29697,17402,3676
,20035,28712,29184,235321
1260 DATA 20035,28695,29194,29698,20035,28679,2970
1,17402,-100,20035,223374
1270 DATA 28695,12860,130,29698,20035,28679,29703,
17402,-115,20035,187122
1280 DATA 28695,12860,320,29698,20035,28679,29701,
17402,-128,20035,187297
```

```
1290 DATA 28695,12860,225,29698,20035,13432,206,12
858,3384,20114,141507
1300 DATA 28695,29269,29698,20035,13432,206,12858,
3358,20114,29184,186849
1310 DATA 29696,30208,30720,31232,31744,32256,1285
7,2,-32722,-32004,133989
1320 DATA 200,3137,360,27382,17914,3362,13441,2918
4,17914,3342,116236
1330 DATA 9404,100,100,17914,3324,13500,9,17914,33
18,13500,79083
1340 DATA 2,17914,3312,16978,17914,3308,16978,1791
4,3308,17042,114670
1350 DATA 17914,3306,17042,17914,3342,13500,220,-2
5138,32256,17402,97758
1360 DATA 4004,18938,3900,18426,3103,13432,286,201
14,18938,3670,104811
1370 DATA 18426,3098,13432,286,20114,18426,3088,18
938,3760,20114,119682
1380 DATA 28688,17914,3288,16986,20936,-4,28688,17
914,3310,16986,154706
1390 DATA 20936,-4,17914,3266,13692,30,28,17914,32
90,13692,90758
1400 DATA 100,28,17914,3350,13500,240,13692,110,2,
13692,62628
1410 DATA 256,4,13692,110,6,13692,272,8,13692,110,
41842
1420 DATA 10,13692,240,12,13692,100,14,13692,256,1
6,41724
1430 DATA 13692,100,18,13692,272,20,13692,100,22,2
8683,70291
1440 DATA 18426,3250,14042,20936,-4,17914,3228,286
77,13564,-1,120034
1450 DATA 20936,-6,17914,3226,13692,150,2,13692,13
0,6,6742
1460 DATA 13692,140,10,13692,50,14,13692,60,18,136
92,55060
1470 DATA 70,22,17914,3044,13500,6,12858,3036,1900
9,26368,95827
1480 DATA 2630,12858,3008,19009,26368,2620,17914,3
038,22610,3154,113209
1490 DATA 360,27394,16978,17914,3026,21074,3154,20
0,27394,16978,154472
1500 DATA 17914,2972,19026,26374,24832,2474,24592,
12858,2984,13370,147396
1510 DATA 2982,13882,2968,24832,3872,12858,2976,13
370,2974,30208,110922
1520 DATA 24832,3780,18938,3578,17914,2946,3154,1,
26126,12858,114127
1530 DATA 2944,13370,2942,30215,24832,3752,24832,3
658,5121,514,112180
1540 DATA 2,3074,2,26128,17914,2902,21330,3154,-1,
26116,100621
1550 DATA 13500,35,5121,514,16,3074,16,26126,17914
2874,69190
1560 DATA 21074,3154,36,26114,16978,17402,3592,131
14,2856,13432,117752
1570 DATA 286,18426,2761,20114,5121,514,4,3074,4,2
6122,76426
1580 DATA 13432,286,18426,2748,20114,5121,514,128,
3074,128,63971
1590 DATA 13432,13432,284,16993,28680,20114,28694,
20114,28675,20114,203434
1600 DATA 28881,20114,17914,2802,9402,2794,513,64,
3073,64,85621
1610 DATA 26156,17914,2750,19026,26148,17914,2764,
19026,26112,28,157838
1620 DATA 28689,18426,2976,20033,13500,1,17402,347
0,13432,286,118215
1630 DATA 28624,2665,20114,12858,2730,3137,15,2612
4,17914,2718,106701
1640 DATA 16978,17914,2714,16978,12858,2706,3073,1
26160,13432,112814
1650 DATA 286,18426,2592,20114,17914,2688,21074,13
432,284,28916,125726
1660 DATA 20114,28674,20114,18426,2676,13977,28922
20114,28674,20114,201805
1670 DATA 18426,2664,13977,13432,284,28874,20114,2
8676,20114,12825,159386
```

```
1680 DATA -19846,2632,27408,13432,284,13114,2622,2
8680,20114,28875,117315
1690 DATA 20114,13370,2610,17474,-19902,27150,1343
2,284,13058,28680,116270
1700 DATA 20114,28875,20114,13432,284,28880,20114,
28676,20114,12825,193428
1710 DATA -19846,2572,27408,13432,284,13114,2562,2
8680,20114,28881,117201
1720 DATA 20114,13370,2550,17474,-19902,27150,1343
2,284,13058,28680,116210
1730 DATA 20114,28881,20114,17402,3256,17914,2502,
19026,26112,144,155465
1740 DATA 13432,286,18426,2401,20114,13432,284,288
86,20114,28674,146049
1750 DATA 20114,18426,2496,13977,28892,20114,28674
,20114,18426,2484,173717
1760 DATA 13977,13432,284,16890,2472,3152,35,27152
,12476,35,89905
1770 DATA 13116,35,28680,20114,28887,20114,3152,47
0,27408,12476,154452
1780 DATA 470,13116,470,28680,20114,28887,20114,16
890,2426,3152,134319
1790 DATA 10,27152,12476,10,13116,10,28680,20114,2
8893,20114,150575
1800 DATA 3152,220,27408,12412,220,13116,220,28680
,20114,28893,134435
1810 DATA 20114,16890,2376,13432,284,3152,220,2749
4,3152,298,87412
1820 DATA 27232,16890,2358,3152,85,27478,3152,127,
27216,18426,126116
1830 DATA 2576,28689,20033,16890,2332,3152,256,271
50,13116,-1,114193
1840 DATA 28680,20114,28875,20114,24588,13116,1,28
680,20114,28875,213157
1850 DATA 20114,16890,2298,3152,105,27150,13116,-1
,28680,20114,131618
1860 DATA 28881,20114,24588,13116,1,28680,20114,28
881,20114,17914,202403
1870 DATA 2392,17402,2376,18426,2408,21643,21642,2
8677,24844,21641,161451
1880 DATA 22666,22667,20936,-10,24614,3153,1,26142
,12819,-19886,113102
1890 DATA 26374,27914,21074,24584,12988,2,24588,21
330,12842,-2,171694
1900 DATA 13330,24832,2938,20085,17402,2914,16890,
2202,17914,2234,120741
1910 DATA 28688,12506,20936,-4,16890,2220,12476,10
,18938,2570,115230
1920 DATA 17914,2140,13500,-2,17914,2134,13500,12,
17914,2128,87154
1930 DATA 16978,17914,2124,13500,-15,24832,164,168
90,2140,17914,112441
1940 DATA 2172,28688,13528,20936,-4,16890,2124,179
14,2190,28688,133126
1950 DATA 12506,20936,-4,16890,2142,12476,220,1893
8,2600,17914,104618
1960 DATA 2062,13500,2,17914,2056,13500,-2,17914,2
050,13500,82496
1970 DATA 10,17914,2044,13500,15,24916,16890,2062,
17914,2128,97393
1980 DATA 28688,13528,20936,-4,12858,2006,17914,20
04,-19886,26368,104412
1990 DATA 32,3154,32767,27394,16978,28695,8316,1,1
304,5,147821
2000 DATA 29184,12860,390,29698,20035,12858,1966,1
3432,206,20114,140743
2010 DATA 17402,2702,17914,1950,13498,1948,24576,-
1082,17402,2686,98996
2020 DATA 13432,284,28832,20114,28676,20114,12825,
3137,1,27146,154561
2030 DATA 18426,1793,13432,286,20114,17914,1974,19
026,26374,24832,144171
2040 DATA 1334,20085,17914,1930,19026,26112,270,16
890,1918,29184,134663
2050 DATA 12858,1942,-19888,26112,254,12858,1872,1
7914,2004,-11654,44272
2060 DATA 1862,3186,2,4096,26378,-19846,1854,26350
,24576,224,66862
```

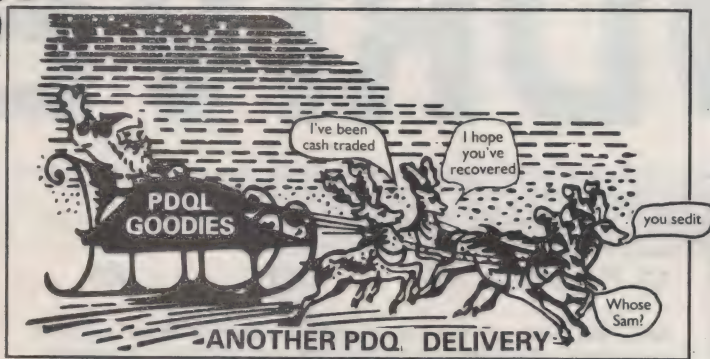
2070 DATA 16290, 1906, 12417, 13756, 3, 4096, 17914, 1862
13500, 1, 82345
2080 DATA 18426, 1866, 14012, 2, 18426, 1860, 16979, 1343
2, 284, 13114, 98401
2090 DATA 1832, 28680, 20114, 28910, 20114, 28680, 20114
, 28881, 20114, 13114, 210555
2100 DATA 1850, 28680, 20114, 28887, 20114, 13432, 284, 1
8426, 1916, 13370, 147073
2110 DATA 1828, -7350, -10558, 13075, 28680, 20114, 28880
0, 20114, 28684, 20114, 143581
2120 DATA 13355, 2, -11142, 1742, 13058, 28680, 20114, 1
432, 285, 18426, 97953
2130 DATA 1600, 20114, 17914, 1756, 13465, 19026, 27140,
1618, 36, 13432, 116101
2140 DATA 184, 28886, 20114, 28674, 20114, 12825, 16890,
1748, 24, 13114, 12
2150 DATA 133, 190, 27448, 12476, -1, 13116, -1, 28680, 2
0114, 28694, 133763
2160 DATA 20114, 28898, 20114, 28686, 20114, 28899, 2011
4, 288952, 20114, 28686, 244631
2170 DATA 20114, 28893, 20114, 17914, 1674, 1106, 18, 190
26, 27140, 1618, 137617
2180 DATA 36, 17402, 2360, 17914, 1648, 19026, 26368, 4
18426, 1496, 104720
2190 DATA 13432, 286, 20114, 13432, 284, 28880, 20114, 28
674, 20114, 16890, 162220
2200 DATA 1618, 12441, 28886, 20114, 28674, 20114, 16890
, 1606, 12441, 12858, 155642
2210 DATA 1618, 13370, 1616, 30208, 24832, 2392, 17914, 1
994, 1926, 24032, 138954
2220 DATA 12858, 1592, 13370, 1590, 30215, 24832, 2370, 1
7914, 1582, 9402, 115725
2230 DATA 1574, 17914, 1568, 3154, 15, 27406, 16978, 1791
4, 1554, 16978, 105055
2240 DATA 17914, 1552, 17042, 17914, 1528, 19026, 26368,
206, 12858, 1520, 115928
2250 DATA 13370, 1518, 13882, 1516, 1603, 46, 24832, 2386
, 17914, 1506, 78573
2260 DATA 19026, 26414, 17914, 1500, 19026, 26150, 12858
, 1484, 13370, 1482, 139224
2270 DATA 13882, 1446, 17475, -11197, 13882, 1498, -7349
, 17914, 1576, 13697, 62824
2280 DATA 12288, 13598, 12290, 24832, 2174, 17402, 2152,
17914, 1, 19026, 162716
2290 DATA 26368, 60, 17914, 1442, 3154, 2, 26368, 48, 1791
4, 1426, 94694
2300 DATA 19026, 26112, 58, 17914, 1422, 19026, 26112, 28
13500, 1, 123179
2310 DATA 28689, 18426, 1580, 20033, 13114, 1382, 13432,
286, 18426, 1302, 116670
2320 DATA 20114, 17914, 1386, 19026, 26368, 50, 13432, 28
6, 18426, 1305, 118307
2330 DATA 20114, 17914, 1368, 21074, 13432, 284, 28874, 2
0114, 28674, 20114, 171962
2340 DATA 16890, 1352, 12441, 28868, 20114, 28674, 20114
, 16890, 1340, 12441, 159124
2350 DATA 17914, 1314, 19026, 26368, 92, 17914, 1312, 190
26, 26112, 82, 129160
2360 DATA 12858, 1926, -7351, 18426, 1404, -10303, 13331
, 17914, 1282, -19374, 32513
2370 DATA 26112, 58, 13355, 2, -11142, 1238, 17914, 1266,
-19374, 26112, 55541
2380 DATA 40, 17914, 1260, 16890, 1258, 13500, 1, 12476, 1
1, 13432, 76772
2390 DATA 284, 16993, 28680, 20114, 28694, 20114, 28893,
20114, 28899, 20114, 212899
2400 DATA 17914, 1218, 12858, 1244, 13370, 1232, -7350,
28094, -19886, 26182, 18688
2410 DATA 12858, 1196, 13370, 1194, 13884, 36, 24832, 206
6, 12858, 1180, 83474
2420 DATA 13370, 1178, 14394, 1142, 17476, -11196, 13884
36, 24832, 2042, 77158
2430 DATA 17914, 1154, 16890, 1158, 16978, 16976, 17914,
1116, 13370, 1194, 129344
2440 DATA 1138, 16978, 17914, 1134, 16978, 17914, 1132, 3
154, 1, 26112, 102455
2450 DATA 32, 17914, 1122, 3154, 1, 26112, 20, 17914, 1106
21330, 88705
2460 DATA 3154, -1, 26112, 16, 13500, 35, 17914, 1090, 3154
1, 164965
2470 DATA 26112, 70, 16890, 1096, 19024, 27406, 17914, 10
68, 3154, 18, 112752
2480 DATA 26112, 50, 24586, 17914, 1054, 19026, 26112, 38
16890, 1048, 132830
2490 DATA 16976, 13432, 284, 16993, 28680, 20114, 28893,
20114, 13114, 1044, 159644
2500 DATA 28680, 20114, 28692, 20114, 28899, 20114, 1791
4, 1002, 19026, 26368, 210923
2510 DATA 192, 17914, 950, 19026, 26112, 182, 17914, 994,
3154, 1, 86439
2520 DATA 27496, 17914, 952, 19026, 26368, 162, 12858, 96
4, 23361, -19846, 109255
2530 DATA 944, 27136, 148, 1601, 10, -19846, 932, 27392, 1
36, 12858, 51311
2540 DATA 940, 23361, -19846, 920, 27136, 122, 1601, 10, -
19846, 908, 15306
2550 DATA 27392, 110, 17914, 922, 21330, 16890, 892, 1704
0, 16890, 878, 120258
2560 DATA 16976, 16890, 874, 16976, 28689, 18426, 1104, 2
2530, 174, 1840, 138722
2570 DATA 1618, 10, 24642, 17914, 868, 16978, 12858, 884,
13370, 882, 90020
2580 DATA 30208, 24832, 1658, 16890, 866, 17040, 17914, 8
50, 16978, 17914, 145150
2590 DATA 846, 16978

2750 DATA 500, 13370, 498, 30244, 24832, 1390, 28689, 1894
2752, 20033, 1138734
2760 DATA 18726, 309, 18938, 1098, 13432, 286, 20114, 179
14, 460, 16978, 107955
2770 DATA 17914, 462, 17042, 17914, 452, 9404, 100, 100, 1
7914, 416, 81718
2780 DATA 16978, 20085, 12858, 434, 13370, 432, 13882, 40
0, 24832, 1322, 104593
2790 DATA 28689, 18426, 668, 20033, 20085, 12858, 386, 17
914, 384, -19886, 99557
2800 DATA 27394, 13441, 28689, 18426, 676, 20033, 31051,
31232, 12858, 382, 184982
2810 DATA 13370, 380, 13829, 24832, 1272, 12860, 2500, 20
337, -2, 21061, 111039
2820 DATA 3141, 356, 26114, 31232, 20942, -34, 18426, 598,
28689, 20033, 149177
2830 DATA 31781, 12858, 536, 13370, 334, 13830, 24832, 12
26, 12860, 10000, 121427
2840 DATA 20937, -2, 21062, 3142, 46, 26338, 12858, 306, 1
3370, 304, 98361
2850 DATA 30244, 24832, 1196, 18426, 560, 28689, 20033, 2
8685, 29184, 27696, 21156
2860 DATA 30463, 8316, 1, 1, 17402, 450, 20035, 28717, 291
87, 29697, 164269
2870 DATA 20035, 28716, 29185, 20035, 28713, 29186, 2003
5, 28695, 12860, 181, 217641
2880 DATA 13372, 121, 20035, 28679, 29705, 17402, 50, 200
35, 28695, 12860, 170954
2890 DATA 179, 13372, 119, 20035, 28713, 29191, 20035, 17
402, 26, 28679, 11651
2900 DATA 29705, 20035, 28680, 29439, 13884, 200, 8828, 0
0, 0, 20033, 150804
2910 DATA 20085, 18241, 19781, 8271, 22085, 21182, -1030
6, -8812, -13420, -12032, 65075
2920 DATA -25891, -25885, -25903, -25897, -25909, -2591
5, -27487, 160, -23030, -24320, -230077
2930 DATA -10740, 4132, 5654, 6877, 6371, -1520, 512, -12
068, -24562, 6749, -22575
2940 DATA -10526, -24562, 2775, 214, -13814, -10276, -12
278, -8760, -2840, 2805, -77462
2950 DATA -1298, 2811, 8, -15346, 5658, -19688, -21248, -
19814, 3786, 2763, -62368
2960 DATA -21350, 5792, 2769, 214, -2596, -1102, -23026,
-5716, -23026, -4352, -74839
2970 DATA 2220, 3606, 6834, 3604, -24562, -16616, -19954
5, 5280, 3769, -12085, -47904
2980 DATA -10555, 202, -16886, -13372, -18422, -15104, 0
0, 0, 0, -74137
2990 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3000 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3010 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3020 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3030 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3040 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3050 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3060 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3070 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3080 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3090 DATA 512, 256, 0, 0, 470, 15, 15, 8, 450, 240, 1966
3100 DATA 35, 15, 2568, 0, -21846, 500, 3840, 3846, 656, 2
56, -4131
3110 DATA 2568, 0, -21846, 527, 3841, 3848, 5120, 256, 256
8, 0, -3118
3120 DATA -21846, 266, 3841, 3843, 12032, 256, 2568, 0, -2
1846, 25600, 4714
3130 DATA 0, 0, 15, 256, 2816, 0, 0, 0, 0, 0, 0, 3087
3140 DATA 0, 256, 2568, 0, -21846, 320, 3840, 0, -256, 256
14862
3150 DATA 2047, 25600, 0, 0, 0, 0, 2047, 25600, 0, 2039, 573
33
3160 DATA 4096, 0, 2043, 18301, 6793, 2051, 20480, 0, 0, 0,
53764
3170 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3180 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3190 DATA 0, 0, 2056, 28160, 0, 2055, 26880, 0, 2051, 20480
81682
3200 DATA 0, 2046, 22876, 24876, 2047, 25600, 0, 0, 0, 0, 77
445
3210 DATA 2047, 25600, 0, 2039, 4096, 0, 2043, 18301, 6793
2051, 62970
3220 DATA 20480, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 20480
3230 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3240 DATA 0, 0, 0, 0, 0, 0, 2056, 28160, 0, 2055, 32271
3250 DATA 26880, 0, 2051, 20480, 0, 2046, 22876, 24876, 0,
0, 99209
3260 DATA 0, 2047, 16384, 0, 2057, 16384, 0, 2051, 20480, 0,
59403
3270 DATA 0, 0, 0, 0, 0, 0, 2044, 26214, 26214, 2055, 56527
3280 DATA 25600, 0, 2046, 22876, 24876, 0, 0, 0, 0, 0, 75398
3290 DATA 0, 2055, 25600, 0, 2055, 25600, 0, 0, 0, 0, 55310
3300 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3310 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3320 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3330 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3340 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3350 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3360 DATA 0, 0, 2305, -1, -4, 510, 18426, -10, 28689, 20033
69948
3370 DATA 20085, 10876, 2, 0, 24385, 23618, 17474, 1602, 2
55, -7095, 91202
3380 DATA -

```

3600 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3610 DATA 0,0,0,0,0,0,0,0,0,0,16384,0,16384
3620 DATA -16384,3,16384,4,-32768,24,-32768,96,-32768,128,-98049
3630 DATA -32768,121,0,5,0,3,0,1,0,0,-32638
3640 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3650 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3660 DATA 8192,0,-8192,7,16384,24,16384,224,-32768,504,759
3670 DATA -32768,9,0,5,0,6,0,2,0,0,-32746
3680 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3690 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3700 DATA 0,0,28672,7,-24576,120,16384,480,16384,248,37495
3710 DATA -32768,9,0,10,0,6,0,4,0,0,-32739
3720 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3730 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3740 DATA 0,0,6144,31,-4096,480,8192,192,16384,49,27376
3750 DATA -32768,10,0,12,0,8,0,0,0,0,0,-32738
3760 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3770 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3780 DATA 0,0,0,255,-2048,96,12288,16,-16384,17,760
3790 DATA 0,38,0,40,0,48,0,0,0,0,126
3800 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3810 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3820 DATA 0,240,0,79,-4096,32,6144,16,24576,17,27089
3830 DATA -32768,30,0,48,0,32,0,0,0,0,-32658
3840 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3850 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3860 DATA 0,96,0,62,0,33,-8192,16,7168,32,-785
3870 DATA -4096,47,0,112,0,0,0,0,0,0,-3937
3880 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3890 DATA 0,0,0,0,0,0,0,0,0,0,48,48
3900 DATA 0,44,0,17,0,16,-8192,32,4096,64,-3921
3910 DATA 30720,255,-32768,0,0,0,0,0,0,0,-1793
3920 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3930 DATA 0,0,0,0,0,0,0,0,32,0,56,88
3940 DATA 0,22,0,17,0,16,-16384,96,8192,255,-7786
3950 DATA -2048,0,0,0,0,0,0,0,0,0,0,-2048
3960 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
3970 DATA 0,0,0,0,0,0,0,0,8,0,20,28
3980 DATA 0,18,0,17,0,16,-16384,224,8192,511,-7406
3990 DATA -28672,0,30720,0,0,0,0,0,0,0,2048
4000 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4010 DATA 0,0,0,0,0,0,0,0,0,0,6,10
4020 DATA 0,9,0,9,0,112,-32768,448,16384,60,-15746
4030 DATA 8192,3,-8192,0,12288,0,0,0,0,0,12291
4040 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4050 DATA 0,0,0,0,0,0,0,0,2,0,6,8
4060 DATA 0,5,0,23,0,480,-32768,192,-32768,56,-64778
4070 DATA 16384,6,16384,1,-24576,0,24576,0,0,0,32773
4080 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4090 DATA 0,0,0,0,0,0,0,0,1,0,3,4
4100 DATA 0,5,0,248,-32768,64,-32768,48,-32768,8,-97931
4110 DATA -32768,6,16384,1,-16384,0,16384,0,0,0,-16377
4120 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4130 DATA 0,0,0,0,0,0,0,0,-32768,1,-32767
4140 DATA -32768,250,-32768,68,-32768,32,-32768,24,-32768,4,-163462
4150 DATA -32768,2,-32768,1,-32768,0,-32768,0,0,0,-131069
4160 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4170 DATA 0,0,0,0,0,0,0,0,0,0,16384,0,16384
4180 DATA -16384,115,16384,44,-32768,32,-32768,16,-32768,8,-98089
4190 DATA -32768,5,0,5,0,3,0,1,0,0,-32754
4200 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4210 DATA 0,0,0,0,0,0,0,0,0,0,48,48
4220 DATA 8192,44,-8192,19,16384,16,16384,8,-32768,8,95
4230 DATA -32768,5,0,5,0,2,0,2,0,0,-32754
4240 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4250 DATA 0,0,0,0,0,0,0,0,32,0,24,56
4260 DATA 0,20,28672,19,-24576,8,16384,0,16384,8,6927
4270 DATA -32768,9,0,6,0,6,0,4,0,0,-32743
4280 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4290 DATA 0,0,0,0,0,0,0,0,8,0,17,20
4300 DATA 0,10,2048,9,4096,8,8192,8,16384,9,20572
4310 DATA -32768,10,0,12,0,8,0,0,0,0,-32738
4320 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4330 DATA 0,0,0,0,0,0,0,0,4,0,10,14
4340 DATA 0,9,0,17,2048,16,12288,16,16384,17,6969
4350 DATA 0,38,0,40,0,48,0,0,0,0,126
4360 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4370 DATA 0,0,0,0,0,0,0,0,0,0,3,5
4380 DATA 0,5,0,4,-4096,8,6144,0,24576,17,26666
4390 DATA -32768,30,0,48,0,32,0,0,0,0,-32658
4400 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4410 DATA 0,0,0,0,0,0,0,0,1,0,3,4
4420 DATA 0,2,-32768,4,-16384,8,14336,16,3072,16,-31698
4430 DATA -4096,47,0,112,0,0,0,0,0,0,-3937
4440 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4450 DATA 0,0,0,0,0,0,0,0,-32768,1,-32767
4460 DATA -32768,2,-32768,12,-32768,16,-16384,32,12288,64,-102274
4470 DATA 30720,255,-32768,0,0,0,0,0,0,0,-1793
4480 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4490 DATA 0,0,0,0,0,0,0,0,0,0,16384,0,16384
4500 DATA -16384,3,16384,4,-32768,24,-32768,96,24576,17,27089
4510 DATA -2048,0,0,0,0,0,0,0,0,0,-2048
4520 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4530 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4540 DATA 8192,0,-8192,7,16384,24,16384,224,8192,511,41726
4550 DATA -28672,0,30720,0,0,0,0,0,0,0,2048
4560 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4570 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4580 DATA 0,0,28672,7,-24576,120,8192,448,16384,60,29307
4590 DATA 8192,3,-8192,0,12288,0,0,0,0,0,12291
4600 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4610 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4620 DATA 0,0,6144,31,-4096,480,8192,192,16384,56,27383
4630 DATA 16384,6,8192,1,-24576,0,24576,0,0,0,24583
4640 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4650 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
4660 DATA 0,0,0,255,-2048,96,12288,16,-
```


Christmas Greetings

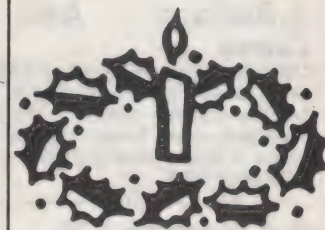


DIGITAL
PRECISION
WOULD LIKE TO
WISH EVERYONE
HAPPY
CHRISTMAS AND
A FUN FILLED
NEW YEAR



Seasonal Greetings to
all QL readers for
Christmas and the New
Year
Best wishes from
Sector Software
39 Wray Crescent
Ulneſ Walton
Leyland, Lancashire
PR5 3NA
0772 454328

QJump thank you
for your support
in 1987 and look
forward to
supporting you in
1988.



The staff of
Suredata
Computer Repair
Centre wish all
their customers a
Merry Christmas
and a happy New
Year

MERRY
CHRISTMAS &
HAPPY NEW
YEAR FROM
ALL AT
SANDY UK



TO ALL OUR CLIENTS
AND FRIENDS A VERY
HAPPY CHRISTMAS
AND A PROSPEROUS
NEW YEAR FROM
EVERYBODY AT
SMILING SOFTWARE
TEL: 061 427 5245



WISHING ALL
OUR READERS &
ADVERTISERS A
MERRY
CHRISTMAS AND
A PROSPEROUS
NEW YEAR FROM
ALL AT QL
WORLD

SEASONS
GREETINGS TO ALL
OUR ADVERTISERS
AND FRIENDS
FROM WD
SOFTWARE
HILLTOP
ST MARY
JERSEY
0534 31392



TO ALL
QL READERS
A VERY
MERRY CHRISTMAS
AND A PROSPEROUS
NEW YEAR
FROM EVERYONE
AT STRONG
COMPUTERS
0267 231 246

MIRACLE SYSTEMS
WOULD LIKE TO
WISH EVERYBODY
A MERRY
CHRISTMAS & A
HAPPY NEW YEAR
TEL: 0454 317772



SEASONS GREETINGS
TO ALL: FROM
MPC SOFTWARE
THE NOTTINGHAM
68000 CENTRE
40 BRIDGEFORD Rd
WEST BRIDGEFORD
NOTTINGHAM
(0602) 820106/455114

MICRODRIVE

THE PROGRAMS

Author	Language	Program Name	Price
1. Giles Todd	B	DIY Assembler	£5

Featured in the March to June 1985 issues of *QL User*, this complete two-pass assembler will assemble all 68008 code and support the assembler directives DRG, END, EQU, DC and DS.

2. Richard Cross	A+O	Mini Monitor	£3
------------------	-----	--------------	----

Using approximately 3K of RAM, this handy utility will multi-task on your QL, leaving plenty of room for other programs. Commands include dumping registers, memory — and ASCII — machine code trace, register store, memory move, memory store — byte, word and long — and jumps. Featured in *QL User*, October 1985.

3. A Didcock	B	Connect4	£1
--------------	---	----------	----

A SuperBasic version of the classic four-in-a-row game where counters drop down slots in the vertical board. First printed in *QL User*, September 1985.

4. Shergold & Tose	B	Golf	£2
--------------------	---	------	----

With up to 50 courses of varying difficulty, lakes, rivers, bunkers and trees, this is a fine golf simulation. You decide the power and direction of each stroke, striving for a birdie, eagle or even an albatross. Your scorecard may be saved. This program was printed in the May 1985 issue of *QL User*.

5. Williams & Holliday	A+O	Paladin	£5
------------------------	-----	---------	----

Written completely in machine code, this excellent *Space Invaders* game was the basis of our games programming series, started in April 1985.

6. Richard Cross	M+B	Sprite Animation	£2
------------------	-----	------------------	----

This contains two programs from the April 1985 issue. The first is a SuperBasic multi-coloured sprite designer. The second contains machine code routines to animate the sprites on the screen.

7. Steve Deary	B	Pacman	£1
----------------	---	--------	----

A well-written maze game from the March 1985 issue. Almost 20 screens of increasing difficulty, including an invisible maze, make it a very versatile rendition of the arcade favourite.

8. Andy Carmichael	B	Family Tree	£3
--------------------	---	-------------	----

Based on an article in the August 1985 issue, this is an Archive program and database for setting-up and displaying large family trees.

9. James Lucy L		Composer	£3
-----------------	--	----------	----

Completed in *QL User*, October 1985 this QLiberated program will allow you to compose, play and amend your own melodies. The program will handle sharps, vary tempo, and even specify staccato and legato playing styles.

10. Matthew Capp	B	Miners	£2
------------------	---	--------	----

This interesting simulation, printed in the August 1985 issue, puts you in the role of the NCB, buying and selling coal and mines, hiring and firing miners, and raising or decreasing wages to match economic forces. The object is to be profitable but inexperienced players will find it difficult even to remain solvent.

11. P J Smith	B	DIY Adventure	£1
---------------	---	---------------	----

From the February 1985 issue, this skeleton program requires you to slot in the details to create your own adventure programs.

12. R Green	B	Othello	£1
-------------	---	---------	----

This classic board game, printed in *QL User*, August 1985, can be played by one or two players. The display uses a 3D representation of the board. Average response time by the computer opponent is about 15 seconds.

13. S J Ackers	S	Touch Type	£4
----------------	---	------------	----

This program consists of a 13-lesson course for typing-in letters, words and phrases, a 700-word vocabulary, an interactive keyboard display and a fingering chart inas more than 30K of code. Scores are displayed based on the time and accuracy of typing. A reduced version of the program was printed in the August 1985 issue.

14. Rob Sherratt	A+O	Fcopy	£4
------------------	-----	-------	----

The first part of this program was printed in the March 1986 issue of *QL World*. The program is an ultra-fast, general-purpose file spooler.

15. Alan Prior	B	World Map	£2
----------------	---	-----------	----

From the March 1986 issue, this program will draw a full-screen, multi-coloured map of the world for geography buffs.

16. J M Dower	B	Mushyman	£2
---------------	---	----------	----

Printed in the June and July 1986 issues, this provides speedy SuperBasic arcade action as you munch your way round the screen.

17. Tony Quinn	S	CAD QL	£4
----------------	---	--------	----

CAD design programs are particularly suited to the QL. This version from the September 1986 issue includes features such as rubber-banding and a user-definable symbol library.

18. Stuart Campbell	M+B	Attack of the Things	£3
---------------------	-----	----------------------	----

Typical science fiction horror arcade action as yet more nasties descend on harmless QL owners. Featured in the October 1986 issue of *QL World*.

19. Karl Jeffery	M+B	Starport 2001	£3
------------------	-----	---------------	----

Fast machine code action in this November 1986 version of the *Galaxians* arcade game.

20. Marcus Jeffery	S	QL Go	£4
--------------------	---	-------	----

The oriental game of Go is so complex that even mainframe programs are easily beaten by novice players. To the best of our knowledge, this 15x15 version from the April and May 1986 issues is the only one available for the QL.

21. J P Hartley	B	Britain	£2
-----------------	---	---------	----

Another program for geography buffs from the November 1986 issue of *QL World*. This is a round-Britain geography quiz.

22. KBG Judson	B	Darts	£2
----------------	---	-------	----

Program of the Month from December 1986. This popular pub pastime requires good hand and eye co-ordination to stop a moving cursor on the on-screen board.

EXCHANGE

READY TO RUN SOFTWARE

KEY	B = SuperBasic	A+B+O = Assembler and Basic Loader and Object Code
	A+O = Assembler and Object Code	S = Supercharged
	M+B = Machine Code and Basic Loader	L = QLiberate

23. Neil Taylor S Window Designer £2

This useful routine from the February, 1987 issue allows you to design your SuperBasic windows using the cursor keys. It creates a one-line procedure which, when merged into your program, will re-create that window.

24. J F S Design 3D £4 Tydeman

Published in the March and April 1987 issues, this program will allow you to produce 3D screen designs with the minimum of fuss and aggravation.

25. D Carmona B Stellaris £4

Program of the Month from June 1987. This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics.

26. Robert A+B+O Video £3 Noble Effects Box1

These machine code SuperBasic extensions allow you to manipulate your screens, save and recall them from memory and clear them in interesting ways. Program of the Month for July 1987.

27. H R Pendry B Pontoon £3

A graphic version of the classic card game. You play against the computer. Features include changing banker on royal pontoons, accurate betting, five card tricks and so on. Printed in the July 1987 issue of *QL World*.

28. Kenneth B Picture £2 Cameron Puzzle

This short but interesting program from the July 1987 issue sets up an 8 x 8 sliding block puzzle with on-screen graphics. You can select sliding numbers or load your own picture to solve.

29. Peter B Bridge £4 Etheridge

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and much more. Essential for card enthusiasts.

30. Charles B Psycho £4 Gerrard

We must apologise but we have had to remove this program temporarily from microdrive exchange. People who have sent orders will have their money refunded and details will appear as soon as the program is again available.

31. B Otridge Crossword £5

Sold originally as a commercial program, this is the perfect aid for crossword fanatics. The program provides access by word length to a dictionary of about 12,500 words, to help solve those elusive crossword clues. Note: This program requires two Microdrive cartridges.

32. Phillip B Advent2 £4 Sproston

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

33. Leslie B Clock £3 Fahidy

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. An on-screen clock can be used to set or read the time.

34. E. Bamber QL Con- £2 version/ Calculator

Comprising weights and measures units conventions and reverse Polish calculation, this excellent utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

35. John B Qwhist £3 Wakefield

Our August 1987 Program of the Month. It is an excellent implementation of the classic card game, Whist. Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents.

36. Stanley B Mail Merge £1 Sykes

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. The cartridge includes a simple demonstration.

37. P.G. Ives B The Double £4

A large strategy game in which you manage a football team through the four league divisions. The program features buying and selling, team line-up, morale, and so on, through the full league and F.A. Cup season. The cartridge includes full instructions Quill document showing how to play the game.

38. Leslie B Education £2 Fahidy

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

39. J F Tydeman S Design 3D £4

Featured in the March, 1987 issue, this extensive program includes a large suite of graphics and filing utilities for the production of 2D and 3D graphics. It is supplied complete with instructions in the form of a Quill document.

40. Santiago B Roulette £3 Rubio

Our September, 1987 Program of the Month, this is an excellent Spanish/English version of the traditional gambling game. It also includes the Leigh Pattern, a system to break the bank.

41. Leslie Fahidy B Money £2

Continuing with our series of educational programs, this one sends you on a shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

42. Neil Davidson A+B+OLife £2

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

See over page for order form.

43. Alan S Qsquidge £2

Glassbrook
Ian Swinton

An arcade hunt through an 8x8 grid expandable series of rooms for the necessary nine parts of Squidge's rocket. October, 1987 Program of the Month.

44. David Marsh B Compress £2

Compress is a utility to compress SuperBasic program files into a more compact form without losing the structure of the program. That uses less storage space and means slightly faster loading.

45. Ronnie M+B SuperBreak- £2
Davidson out

A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Special features include optional double bats and/or balls.

46. Norman Marks B Navigator £2

To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of cities on points can be input manually. The calculation formulae can be seen from within the program.

47. Richard B 3D Maze £2
Clements

Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

48. Jason B Yahtzee £2
Price

The November, 1987 Program of the Month was this version of the popular dice game. The on-screen graphics make the two-player program particularly enjoyable and easy to use.

49. Charles B FileBound £3
Dillon

A November, 1987 special for *SpellBound* owners. This extension allows users to utilise their *SpellBound* dictionaries on existing files. An additional feature allows new words to be added to the dictionary. A compiled version is available from PDQL.

50. Jay B Bank £4
Lewington

This well-written, menu-driven program will allow you to keep track of a number of bank accounts, including credits and debits, dated standing orders, printed statements and much more.

51. A B Perspective £1
Didcock

Space is big. This program aims to prove it, with a graphical guided tour of the earth, the solar system, neighbouring suns, galaxy and the whole of creation.

52. Simon M+B Space £3
Quinn Pods

This 100 percent machine code arcade game was our December, 1987 Program of the Month. Your lone ship must protect six central energy pods against marauding aliens.

53. S M B Graphic £2
Walker Writer

Featured in our December, 1987 issue, this is a graphic design program with a difference. In addition to all the usual design commands, your completed picture can be saved as a series of SuperBasic commands for use in your programs.

ORDER FORM

No. of programs required ☐

No. of drives required ☐

No. of drives sent ☐

Program ID Numbers

QL GOLD CARD NUMBER
(IF ANY) ☐

Name

Address

Total cost of programs £

Drive cost (£2 each) £

Sub-total £

Postage & packing £0.75

+ 15% VAT £

TOTAL £

- 10% DISCOUNT FOR QL

GOLD CARD HOLDER £

TOTAL TO BE SENT £

Please copy on to Microdrive the programs above which I have indicated by their ID numbers. I enclose a cheque/PO to the value of £..... made payable to *Sinclair QL World*. I understand that *Sinclair QL World* undertakes to supply only these programs - copied onto Microdrive - and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply

additional information about any of the programs other than that originally printed or supplied. Any article reprints must be ordered and paid for separately at £2 each inclusive of post and packing - £3 overseas.

Please send order form to: Mike McKenzie,
PO Box 74, Tonbridge, TN12 6DW.
Tel: 089 283 4783.

54. L Miles M+B Zapman £3

This fast-action, machine code game is of the classic *Pacman* genre. Variable skill levels and a wide variety of maze formats will keep your interest high.

**55. Alan B Adventure £3
Pemberton Playtime**

An extensive adventure where you must complete tasks for the inhabitants of a strange and unusual land. A Quill document gives details of the possible commands and some help in the form of a series of coded messages.

**56. Paul M Space £3
Mckinnon Invaders**

A very fast, very challenging version of what must be one of the best-known arcade games. Includes Quill instructions, ugly descending aliens and protective shields.

**57. Timo B Spelled £3
Salmi**

A complete spelling checker at a very cheap price. The system works on Quill _lis files, checking them against its dictionary of somewhat more than 7,500 words. The dictionary can be expanded automatically as new words are found. This program requires a 512K expansion and occupies two Microdrive cartridges. Quill instructions are included.

**58. Nigel B Radar £2
Ford**

As *Control*, you must monitor a radar, watching the skies, acknowledging aircraft, scrambling jets to intercept UFOs and, if necessary, lining your sights on and shooting down enemy aircraft.

**59. Geoffrey B Dungeons £4
Evelyn**

As Wizard, Mega-Hero, Super-Hero or Elf, you must explore the *Dungeons*, fighting monsters and collecting treasure in this expansive one- to four-player game. Requires two Microdrive cartridges.

THE ALL-NEW MICRODRIVE EXCHANGE

Microdrive Exchange has always been a popular feature of *Sinclair QL World* and, in our constant efforts to improve the magazine, we are expanding the Exchange to bring you even more quality programs at budget prices.

To achieve those results we have altered the format of the Exchange. Rather than calculating the number of sectors required by each program and sending the appropriate number of cartridges, we have now made it a one-program, one-cartridge system. So if you would like, say, four programs, then, regardless of length, you will need four cartridges.

There are a number of advantages to the system. First, the service will be much faster, because programs can be copied in advance. Second, rather than having to ensure having the article for documentation, we will be able to supply Quill documents on the Microdrive, if needed, for future programs.

Finally, for all new programs on the Exchange, rather than just receiving the machine code version, the Supercharged version or whatever, we will be able to supply assembly listings, hex loaders and original SuperBasic versions on the same cartridge, so that you can look at and amend programs.

Naturally, this service will require the transfer of more than the usual number of Microdrives but bear in mind that the number of Microdrives you send will be returned with the software. We have reduced the price of Microdrives to £2 per cartridge.

With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough, please send them for review. The address and details for program submission is given in *The Progs*.

Quest for the Dragon Sword

A challenging text adventure with a large vocabulary, hundreds of locations, masses of original puzzles and several sheep ...

"I laughed until I stopped!" - F.Baggins



ONLY

£14.95



Payment to;

BYTEBACK

6 Mumby Close
Newark, Notts NG24 1JE

MICRO ADS

microdeal

QL GAMES

ALL PROGRAMS FULL MACHINE LANGUAGE

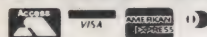
FLIGHT SIMULATOR - Full feature flight simulator of a light aircraft
LANDS OF HAVOC - 2000 Screen arcade adventure described as the first mega game for QL
CRAZY PAINTER - Zany slapstick for painting the floor
HOPPER - Frogger style game for the QL

AQUANAUT 471 - Graphic adventure with over 100 screens
THE KING - Just like Donkey Kong
STONE RAIDER II - Dig your way through screen after screen of boulders and treasures
CUTHBERTS IN SPACE - Real time space shoot 'em up for the QL

NOW JUST

£9.95 EACH

POST & PACKING
£1 PER ORDER



ORDER — By Phone - 0726 68020
By Post - Box 68, St Austell, Cornwall PL23 1ET

THE MOST COMPREHENSIVE RESOURCE FOR THE SINCLAIR QL. GET YOUR COPY TODAY!!

More and more QL owners are discovering the excellent new book by Mike de Sosa — **TAKING THE QUANTUM LEAP: The Last Word On The Sinclair QL**.

This 280 page book is chock full of useful programs and original programming examples. Chapters on using the bundled software and a look at the latest hardware and software releases. Written for both the novice and more advanced users. Priced less than most software packages and nearly two pounds of information!!
£17.50 + £3 post. (Europe). \$26 p.p.d. (USA).

Exclusively available from:

TIME DESIGNS

29772 Hult Road, Colton, Oregon, 97017, USA. Telephone (503) 824-2658. 24 hours.

VISA and MASTERCARD accepted.

For a sample QL and Spectrum magazine, send £3.

Instantly start your

DIGITAL PRECISION QL SUPERCHARGE COMPILER

Version 1.09 to 1.19 (bypasses Lensloc) (genuine owners of Supercharge only)

For a copy of this **USEFUL UTILITY PROGRAM** please send proof of purchase of Supercharge or Lensloc (returnable) and £8.00 (only £6.00 if you send a formatted microdrive cartridge) to:

T. D. MAXWELL
12 Vincent Road
Croydon, Surrey CR0 6ED
Enquiries: 01-654 5730

SINCLAIR QL EXTENDED BASIC ONLY £7.95!

OVER 100 EXTENSIONS

Includes job control, random access files, lounts, memory manipulation, useful functions etc. Supplied on microdrive (£2 cheaper if you send us your own).

M. Warne, 18 Holly Grove,
Stourbridge, WEST MIDLANDS, D18 1UF

0384 373421

QL TRUMPCARD 768K, disk interface, ramdisk, screendump, printer buffer, memory cut, new, unused, boxed, £135 (cost £199). Thomas — Tel: 01-249 7440

ACCOUNTER V2-0

Small Business/Home Integrated Account System £10.50
Larger V2-0E (expanded QL) £11.50
Drive File - A filing cabinet for all your programs £4.50.

SLAVE

A full screen program editor and much more write program as though on a word programmer. ACTIVITIES SUCH AS MOVE, SEARCH, CAT., DELETE, ETC., ETC., ALL AVAILABLE.

An aid for beginner and expert programmers alike.

Microdrive and 50p for demonstration copy.

P.C.C., 10 MALEFANT STREET, CARDIFF CF2 4QB Telephone: 0222 28736

DUMP TROUBLE? - TRY HYPERDUMP

Transfer selected Screen Areas • Construct posters up to 240 linear times • Multitasking with variable priority • Accurate screen proportions maintained

EPSON compatible printers

Further details from: **HARVEY SOFTWARE**

30 Edies Lane, Leavenheath, Colchester, Essex C06 4PA

Tel: (0206) 262912

or send £9.95 specifying cartridge or 3.5" DSDD disk.

MICRODRIVES MICRODRIVES

LIMITED NUMBER OF CLEAN, DE-LABELLED, USED ONCE CARTRIDGES:

£2.65 FOR FOUR - INCLUDING POST & PACKING

CHEQUES/P.O.'s TO

V.I. JENKINSON, BEAUSITE HOUSE, MEDOW LANE, OVER, CAMBRIDGE CB4 5NF

QL SMALL TRADER'S PACK 2

Accounts, VAT, Stock Control, Mailing List, Label Printer plus utilities. All for £24.95 on two mdvs.

'Simple to use, a good deal for the money.' (QL WORLD). 'Fully menu driven & Epson-compatible' QL

INVOICER: prints smart invoices & statements on plain/headed paper. Only £14.95 (£9.95 with pack) QL

BANK ACCOUNT £9.95, QL FILER (4 prgs) £9.95.

Programs Customised/Designed at reasonable cost. Add £2 pp (abroad) Cheques, POs or SAE for details.

SD MICROSYSTEMS (DEPT QL)

PO BOX 24, HITCHIN, HERTS, U.K.

U.K. Tel: (0462) 675106

PROLOG INTERPRETER being written. £30 approx. Basic implementation. Please enquire if interested to: M Gardner, 56 Old Tiverton Road, Exeter EX4 6NG.



QL REPAIRS

ANY FAULT £27.95 INCLUSIVE OF P&P, VAT INSURANCE AND 3 MONTHS GUARANTEE. FOR REPAIRS ON OTHER MICROS PHONE FOR DETAILS.

SUREDATA

Telephone: 01-902 5218

UNIT 6, STANLEY HOUSE
STANLEY AVENUE, WEMBLEY
MIDDXX. HA0 4JBQ

PROBLEMS WITH YOUR QL!

FOR FAST, RELIABLE AND PROFESSIONAL REPAIRS AT COMPETITIVE PRICES

Contact:

P M ENGINEERING



UNIT 8, NEW ROAD, ST IVES,
CAMBRIDGESHIRE PE17 4BG



ST IVES (0430) 61394

ESCAPE Software

ATTENTION ALL MUSIC LOVERS!
SCORE — The Complete Composer's Package

At last you can use your QL to write and play your own music in whatever style you wish! **SCORE** is specially written for use with Miracle System's new MIDI interface. Control up to 16 MIDI instruments (synthesisers, drum machines etc.) using up to 64 independent voices. Alternatively, play music on your synthesiser, record it on your QL, edit it and then replay. Your finished compositions can be used from within your own programs. Features include: automatic harmonisation, automatic arpeggio, large library of rhythms and arpeggio patterns, and much much more! You don't even have to read music to use **SCORE** but if you wish to learn, **SCORE** is your ideal teacher! Come to the launch at the ZX Microfair on Dec. 12!

SCORE (available 12th Dec.) £29.90

MIDI interface (Miracle) £49.00
(plugs into the ROM port and requires fast external memory - e.g. Expanderam or Trump Card - to operate correctly.)

Our Range of Educational Software:

Wendy's Garden: For pre-school children £13.80

QL Spelling Tutor: Our best selling program! £14.95

QL Maths Tutor: Includes Nim and Hi-Lo games £14.95

QL Revisor (Digitron): Indispensable! £14.95

We also supply memory expansion (Expanderam - 512K at £99, Trump Card - 768K at £199) and other hardware and software. Please write or phone for details. Wendy's Garden, and our Tutor programs were compiled with Q Liberator.

Send cheques or P.O.'s to:

ESCAPE Software (Dept. QLW)
2 Henley Road, Ilford, Essex IG1 2TT Tel: 01-478 8281
Overseas orders add £1

Q.L. EXTERNALLY MOUNTED MICRO-DRIVE

£17.00

including p. & p. and VAT

No Overseas Orders

Q PARTS, 74 DUTTON WAY IVER, BUCKS SLO 9NZ

DATA FORMAT COVERSION - Between QL, IBM, CPM. Formats - £5.75

KRAM SOFTWARE - All programs include screen dump and job control keywords

£10 SIDWAYS PRINTER - Full QL character sets - also runs on early Epsoms or compatibles

£8 FUNCTION KEY DEFINER - 20 definitions - works with most packages including Psion

£8 FILE COMPARE - Compares and highlights differences allows realignment

£8 RESET TO MEM SIZE AND TRANSLITERATOR - For running early programs on expanded QLS

£25 QL USERS TOOLKIT - All above plus machine code single key utilities, spooler copier, basic trace, memory display and capstock status plus others. Works with Psion programs and user configurable

Peter or Mark **MANSELL, BESTMALT LTD**

Nantyreglwys, Llanboidy, Dyfed SA34 0DL Tel: 09946 370

MICRO ADS

MZ512K for the QL. Brand-new, one-half megabyte, RAM board for the Sinclair QL. Features: low power, zero wait-state operation; surge-suppresses QL power supply; plugs into expansion port; fully throughported; cover for interfaces; fits inside QL; 5-year warranty; 30-day money-back guarantee. £90.00 to: **Matthew Zenkar**, POB 12534, Rochester, NY 14612-0534. Price includes shipping via insured air mail. Phone 716-663-2048. Sorry, no C.O.D. orders accepted. Cheques take extra time to clear. VISA/MC accepted. Allow 8-10 weeks for delivery. Offer not valid in the United States and Canada (Write for details).

OKOLOKO ENGINEERING SOFTWARE

8380 GLENDALE DRIVE, YPSILANTI, MICHIGAN 48198 U.S.A. Tel: (313) 485-1926

At last the engineering software for "FRAME", "TRUSS", and "GRID" analyses are here to put the QL computer, ZX 48K Spectrum, and the TIMEX/SINCLAIR TS 2068 computers to work for the Consulting Engineering Design Firm, the Civil/Structural Engineer, the Mechanical Engineer and the Engineering Student.

Each software comes with excellent Documentation and three versions (TS 2068 and ZX 48K Spectrum only) for use with a 32 column printer, a standard 80 column printer, and a screen monitor. The QL software contains one version for use with a standard 80 column printer or a screen monitor.

	TS 2068/ 48K Spectrum	QL	
1. "FRAME" + Manual	\$75.00	\$120.00	(W/GRAPHICS)
1. "TRUSS" + Manual	70.00	110.00	(W/GRAPHICS)
3. "GRID" + Manual	70.00	100.00	
4. "SPREAD FOOTING DESIGN"	70.00	100.00	
5. "REINFORCING WALL DESIGN"	100.00		
For even greater savings:			
6. COMB 1+2+3	180.00	260.00	
7. COMB 1+2 or 1+3	120.00	200.00	

All orders by M.O. and Overseas orders by international MONEY ORDER only. All shipping done within 48 hours. Add \$3.00 for shipping and Handling.

DEALERS' INQUIRIES INVITED!!!

FOR A PERMANENT SOLUTION TO POWER CUTS AND MAINS INTERFERENCE FIT AN UNINTERRUPTABLE BATTERY BACKUP TO THE QL

BACKUP INCORPORATES FLOAT CHARGED NICAD BATTERIES PERMANENTLY CONNECTED TO PRESERVE DATA IN THE QL PROCESSOR, MICRODRIVES AND RAM DURING MAINS INTERFERENCE. SUPPLIES THE QL DURING POWER CUTS FOR UP TO AN HOUR. NO SOLDERING OR OPENING UP NECESSARY AND REGULATOR REDUCES QL OVERHEATING.

ES4 inc. to **FREQUENCY PRECISION LTD** Hillsview, Aller Rd., Dilton, Devon EX19 8QP. Tel. 0805 4381

LISP INTERPRETER

Expandable and fast only £12 (35DM) incl. p.&h.

For details send SAE to: W. H. H. Sauer, Postfach 800711, 6230 Frankfurt 80, West Germany

LASER PRINTING from your QUILL or ABACUS files £2. + 25p/page. 3 1/2" disks or Mdv. Also Word Processing facilities. **PENNY'S WORD PROCESSING**, 135 Ellerton Rd., Surbiton, KT6 7UA. For more details telephone (01) 390-5652.

QL JOYSTICK — £7.99 — plugs directly into CTRL 1/2. 2 firing buttons "Probably the best I have seen" QL World 2/87

QL HOUSEWIFE — £5.99 — "A general planner for shopping and meal control. Interesting and useful" QL World 2/87

PREMIER GAMES — £6.99 — QLUck (the five dice game) & Codebreaker (guess the hidden code)

INVESTMENT MONITOR — £19.99 — The ideal method for controlling all your investments.

For further details send S.A.E. for DJW News

HOME BANKER — £14.95 — The finance management program for the QL available soon. Write for details.

NEW MICRODRIVE CARTRIDGES — 10 for £16.65.

SEE US AT THE ZX MICROFAIR, DECEMBER 12TH, STAND NO 33

Order direct from: **DJW Software (QLW12), 11 Pound Close, Bramley, Hants RG26 5BL or 'phone (0256) 881701. Overseas orders please add £2.**

QL ZITASOFT WARE

SIDEWINDER v0.3 Mono screen dump for Epson and compatibles. Create your own screens, draw, plot, text insertion, full or partial scr. upright/sideways. Make your own 20 foot banners or posters, mass produce mdv/address labels, letterheads etc. Proportional/squashed/stretched dumps. Save screens from within other jobs. Gives your QL abilities unique on any machine including Big Blue & the big boys with laser printer. S.A.E. for example dumps and details. (See review QL World Sept. 87, "Absolutely top marks for a superb program".)

TOOLCHEST, toolkit to read and write mdv sectors corrupt, file rescue etc. About 40 FNs with hex Ascii display formatting. Write your own doctor, mem or EDprog in Basic easily! or use the customisable editor provided.

LOCKSMITHE a VERY fast MDV copier with 3 copiers in one. Deals with more than just "most software". it "keys" for all, no other program can claim this. Easy to use just press a key. No more corrupt master mdvs with Locksmithe around.

4MATTER v6.3 (includes Locksmithe). The best all round copier with nothing nearly as successful at MDV to disc (long running) copies. Includes file-sector editor. LEGAL USERS ONLY.

SHRIVEL Deluxe memory shrink program installs selectable 128/192/256K etc auto shrink on any basic boot file. Very easy to use.

SIDEWINDER = £12 LOCKSMITHE = £10 4MATTER £18 SHRIVEL = £5 TOOLCHEST = £8 (inc p&h to Europe) Cheques/POs to

Steve Jones. ZITASOFT 93 FOXBOURNE ROAD, LONDON SW17 8EN

Other suppliers: Care Electronics/Curry Computer USA

COPE ANNOUNCES THE END OF THE ICE AGE!

QATS Version 3 is the front-end system with more facilities and more scope for expansion. Powerful enough to control the largest QL's but compact enough to operate in an unexpanded QL. (QATS + 16K EPROM leaves 40K for the user.) QATS grows with you as your QL and program library grow, and when you move up to a larger machine you won't have to change your operating methods. QATS runs all EXEC-able and SUPERBASIC jobs. QATS is THOR compatible.

QATS is menu-driven for speed and simplicity. Every menu is its own help screen and can be tailored by the user. See our reviews in SQLW Nov and Dec 1986. And August 1987.

QATS Version 3: £25.00; Output control: £20.00; 16K EPROM: £15.00; 32K EPROM: £20.00. These prices include postage and media — MDV, 3.5 or 5.25 (state which).

★ CHRISTMAS OFFER, £5 OFF EACH PRICE QUOTED ★

COPE, 3 Langham Mansions, Earls Court Square, London SW5 9UH

4 FREE QL GAMES. Send a FORMATTED MICRODRIVE or 3.5" disc PLUS £1.20 to cover postage and administration to: Longridge, Bridgend, Stewarton, Ayrshire KA3 5HP. Tel: (0560) 82764. Games are all turbo charged or written in machine code.

QL SMALL TRADER'S PACK 2

Accounts, VAT, Stock Control, Mailing List, Label Printer plus utilities. All for £24.95 on two mdvs. "Simple to use, a good deal for the money" (QL WORLD). Fully menu driven & Epson-compatible. QL INVOICER, prints smart invoices & statements on plain/headed paper. Only £14.95 (£9.95 with pack). QL BANK ACCOUNT £9.95, QL FILER (4 progs) £9.95. Programs Customised/Designed at reasonable cost. Add £2 pp (abroad). Cheques, POs or SAE for details.

SD MICROSYSTEMS (DEPT QL)

PO BOX 24, HITCHIN, HERTS, U.K.

CURES FOR SICK QL's

All parts available ex-stock. Sae for price list. Free fitting instructions for DIY upgrades eg JS ROM. Service exchange boards, Membranes, ULAs, Microdrives. Full technical advice service and postal help line.

Keep your QL Cool, Special Power Supply £16 (VAT & postage incl.)

ADMAN SERVICES, 53 Gilpin Road, Admaston, Telford, Shropshire TF5 0BG. Tel. 0952 55895

SUPERTRACE Watch Basic in action plus single step mode "indispensable..." "The most reasonably priced tool released" see August 87 QL World On MDV £5 including p&p. Stack Software, Great Wolford, Shipton on Stour, Warwickshire CV36 5NQ. Tel: 0608 74369.

OPD/QL FILE INTERCHANGE Give you QL the capability of reading and writing files on microdrive cartridges that are in the format used by the ICL OPD (and the Merlin TONTO). Transfer XCHANGE and SuperBasic files between the OPD and QL. Available for £16 inc. P&P from: D.J. Walker, 22 Kimpton Mead, Potters Bar, Herts EN6 3HZ, or send SAE for full details.

SCIENTIFIC REFERENCES DATABASE

An archive program to store reference, summary, keywords of scientific papers from journals or books. Custom screens. Search on any field. Create and edit subtitles eg bibliography for paper or thesis. Printout selected references or whole file. For program, screen, example database and instructions send £5 and microdrive cartridge (sorry, no discs) to:

T. Ashcroft, 10, Mitchell Avenue, Newcastle-upon-Tyne NE2 3LA

ALPHA-PLAY

An educational program for teaching the alphabet to pre and early school children using fun graphics

£9.99

K BROOKS

12 CAE GORLAN STREET, WEST END, ABERCARN, GWENT

SPY

- Very Fast - Cheap - £14.95
- MULTIPLE-FILE, Multi-tasking
- Universal QL/THOR file editor
- Will read and write any file types
- Latest lazy screen technology
- Block transfer between files
- Professionally written in assembler
- Just one exec code file under 20K
- Loads in under 5 seconds (disk)
- Ideal code size for standard QL's
- Can load itself for configuration!
- Fully ORAM and THOR compatible

OTHER SYSTEMS: Cardfile, Mailfile, Archivist, Librarian, Mailmerge

A.R.K. VISA

POSTAGE UK £0 Europe £2 World £4

CHEQUES UK, Euro, London Sterling

ARK DISTRIBUTION

(Tel: 0983 79 496)

Corve Farmhouse, Chale Green, VENTNOR, PO382LA, U.K.

STARBURST

A challenging new space game for the QL. Written in 100% machine code. Send cheque/postal order for £12.50 to:

Chris Skellern, c/o BLUE CRYSTAL SOFTWARE, 3 BLENHEIM ROAD, ST ALBANS, HERTS AL1 4NS

QUANTA

The Independent QL users group

- * monthly newsletter (36/40 pages)
- * free advice
- * massive software library (mostly free)
- * supports for local groups
- * printers hotline
- * tutors (Archive, etc.)
- * workshops

Further details from Brian Pain, 24 Oxford St, Stony Stratford, Milton Keynes, MK11 1JU Tel: (0908) 564271

SUPER USER BUREAU

**Genuine independent professional support for all users of the SINCLAIR QL, CST "TRF", SANDY "Futura", and QXT-640.*

What are the benefits of having professional support?

★ Each month you will receive a copy of "QL S.U.B.", a magazine containing at least 40 pages of news, reviews, special offers, help services, and sections for members views, and sales and wants.

★ "QL S.U.B." is professionally produced and printed, but has a very fast production schedule. It can keep you up to date better than other publications, and offers more in depth information on features.

★ Excellent discounts on hardware and software to members! Due to exclusive agreements, we can offer the highest discounts to members.

★ We also offer a comprehensive computer supplies service! Whether it is a printer ribbon, or an office chair contact us. Even if you need something more unusual, then we will try to get it for you.

★ We can arrange service contracts, and repairs for you.

★ If you need a particular system, or you want to know if something for QL is available, then we can advise, and supply it.

★ Business membership offers specialised extra services. Please write for full details, or consult us about your needs.

What are the costs of a years support from S.U.B.?

★ Membership is by subscription to "QL S.U.B."

Home user, in the UK, £15.00, abroad, £20.00.

Business user in the UK, £30.00. Sorry N/A outside the UK.

Would you like to see a copy of "QL S.U.B."?

★ Send 50p for an introductory copy, to the address below.

How do you know that we are committed to the market?

★ A number of leading companies have already pledged their support!

SANDY UK PCP LTD, DIGITAL PRECISION, SECTOR SOFTWARE, GAP, MIRACLE SYSTEMS, Liberation Software, COMPWARE, SOFTSPEED . . .

★ *Many other leading companies are soon to join the list above!*

★ Please note that S.U.B. is fully independent of all other companies.

S.U.B., PO BOX 3, SHILDON, DL4 2LW

SUPER USER BUREAU

**Genuine independent professional support for all users of the SINCLAIR QL, CST "TRF", SANDY "Futura", and QXT-640.*

Why should I join S.U.B. when I am in another user group?

★ **QUANTA** members! The two clubs are complimentary organisations, not rivals. We provide full time effort that you can't otherwise get.

E.S.S. members! If you want the kind of back-up you expected from them, try us. We are dedicated to providing **ALL** the machines above with fully professional support. Our success depends on our service.

I do not want to join S.U.B. yet. Can S.U.B. offer me anything?

★ S.U.B. can supply non-members with many advantages too! Contact us for all your QL requirements. We won't be able to offer you special prices, but we can offer you special after sales service.

★ Contact us for all your computer supplies. Again, we can't offer special member's discounts, but we'll try to help you find anything.

Are there any more developments planned for S.U.B.?

★ Yes! Keep an eye on our adverts for the latest news about S.U.B. For example, we are planning to set up a companion VIEWDATA type bulletin board, open to both members, and non members. (There will be special features available to members.

★ We hope to make a library of public domain software available, both for the QL and compatibles using QDOS, and the QL using CP/M. We will be looking out for programs in all languages.

★ We are considering working with other organisations to launch a budget software label for the machines we support. Members could benefit from some commercial support in marketing their programs.

What does S.U.B. offer manufacturers and suppliers?

★ If you haven't already made a deal with us, or you are new to the QL market, contact us, enclosing details about your products.

Can S.U.B. be contacted other than by mail?

★ Soon you will be able to contact us a number of ways. Due to some problems with our new premises, we have experienced a delay. We will have a 24 hour phonenumber, Prestel MBX, TELEX and FAX contacts!

★ Please note that S.U.B. is fully independent of all other companies.

S.U.B., PO BOX 3, SHILDON, DL4 2LW

INSECT

HARDWARE

ABC Electronic

016 49 521 8980881

Care Electronics

0923 67102

Chromagraphica

04012 4699

C.S.T.

0438 352150

Data-Skip (Holland)

1820-20581

Digital Precision

01 527 5493

Disks, interfaces, drives, keyboards, RAM expansions

Tony Firshman Services

01 724 9053

Miracle Systems

0272 603871

QJump

0954 50800

Sandy (U.K.) P.C.P.

0234 219814

Schon Keyboards

04865 3836

Strong Computer Systems

0267 231 246

T.K. Computerware

0303 812052

Tandata

06845 68421

Transform Ltd

089 283 4783

Q.L. World Readers Offers

01 834 1717

Wave

0229 44753/29109

SERVICES

Adman Services

0952 55895

PM Engineering

0480 61394

Suredata

01-902 5218

SOFTWARE

Athene Consultants

0329 283083

Best Malt Ltd

09946 370

Byteback

0636 79097

Complex Data Systems (UK)

Ltd

0635 68686

Compware

0270 582301

Task Swapper (Version 2), Computer One Professional Monitor, Mega Toolbox, Expert System Shell and others

CPC

0772 555034

Datanet Systems

PO Box 121 Luton Beds

Digitrix

0326 40529

Digital Precision

01 527 5493

Turbo Basic compiler, desktop publisher, Editor, Eye-Q graphics, Sprite generator, Super forth, Better basic, Professional and super Astrologer, Media Manager, Supercharge, Blocklands, Droidzone, Arcadia, Reversi, Backgammon, Master Bridge Tutor, CPM emulator

DJW Software

0256 881701

Eidersoft QL

089 283 2552

The mouse and everything else you need for the QL

Escape Software

01 478 8281

Intek Software

01 500 8534

Gap Software

01 552 5452

Javid Systems

041 552 0759

Liberation Software

01 546 7795

Maxtronics R & D Ltd (New Zealand)

63-3 325-546 or CHI SOFT (London)

01 458 7249

Metacomco

0272 428781

Micro Anvika

01 636 2547/580 6382

Microdeal

0726 68020

MPC Software

0602 820106-455114

Okoloko Engineering Software (USA)

313 485 1926

P.D.Q.L.

021 233 3042

General business and Archive Utilities and applications

Pyramide S/W

089 283 2952

The Best Games and lots more!

Quantum Computing (USA)

201 328 8846

Sector S/W

0772 454328

QL and 288 software and hardware

SD Microsystems

0462 675106

Our range of low cost business and practical programmes includes small traders pack

Smiling Software

061 427 5245

Talent Computer Systems

041 552 2118

TK Computer Systems

093 924 621

WD Software

0534 81392

Q.L. World Reader Offers

01-834 1717

Zeataline Projects Ltd

0522 792378

QL SUPERTOOL KIT II by Tony Tebb

THE ULTIMATE QL ENHANCEMENT
Over 118 Commands:- Full Screen Editor, Key Define Print Using, Last Line Recall, Altkey, Job Control, File Handling, Default Directories, Extended Network.

16K Eprom Cartridge Version @£ 29.90d
Configurable Version on Microdrive @£ 28.75d

SANDY PRODUCTS

Sandy SuperQboard (512K, TOOLKIT II etc) @ £187.45d

Sandy 512K THRU-CARD @ £ 77.05d

Sandy 512K THRU-CARD & QRAM Front End @£105.80d

Sandy Disc+ Printer Interface + Utilities @£ 80.50d

SUPER MOUSE/SUPERQBOARD

Gram Multitasking Front End By Tony Tebb

Quality Mouse, 512K RAM, SUPERTOOLKIT II,

Disc & Printer Interface, Cadpak Graphics

Complete with Utilities @£236.90d

QL HARDWARE

Single 3.5" Disc Drive & (Own PSU) @£115.00a

Dual 3.5" Disc Drives & (Own PSU) @£195.50a

"Multi Drive 5.25" — 3.5" £218.50b

Citizen LST — 10 printer £186.88a

QL keyboard Membrane @£ 13.80d

QL Base Computer @£124.20a

QEPHII ADVANCED EPROM PROGRAMMER @£121.90d

Care Eprom Cartridges each @£ 6.90c

Eprom 27128 250ns/16K @£ 5.75c

MAGNETIC MEDIA

Microdrives (Pkt 4) @£ 7.91c

3.5" (each) @£ 2.30c

3.5" (each) @£ 20.70c

THE Q CONTROL BOARD

As specified in the Colin Oppie connexions Series — Please call for details @ £89.95d

CPM EMULATOR for the QL

@£ 44.85d

QL GAMES

AMBITION By Way Ahead @£ 19.95c

Business Orientated Strategy "Super Monopoly"

QL YAHTZEE @£ 9.20c

TONY TEBBY Software (QJUMP)

GRAM "new" COMPLETE QL MULTITASKING FRONT END A TRULY AMAZING DEVELOPMENT FROM QJUMP POP UP MENUS, FAST RAM DISC, UTILITIES, HOTKEYS SCREEN/WINDOW DUMPS, PRINT SPOOLER ETC @£ 29.90d
QIMI QL Internal Mouse Interface. Keeps your Rom port free for Toolkit 2 etc. A surface mounted P.C.B. which fits inside your QL.

QIMI @£ 29.90c

QIMI + GRAM @£ 54.97c

QIMI + MOUSE @£ 69.92c

QIMI + MOUSE + QRAM @£ 89.70c

QFLP (Micro/P disc interface upgrade) @£ 14.95c

QMON II Microdrive @£ 19.95c

QMED (Medic disc interface upgrade) @£ 14.95c

ZITASOFT Software By Steve Jones

LOCKSMITHE copies M/DRIVE — M/DRIVE @£ 11.50c

4MATTER + LOCKSMITH copies M/DRIVE — DISC @£ 23.00c

SHRIVEL memory shrink prog user definable ie 128k or 192k or 256k etc @£ 6.90c

TOOLCHEST utilities to allow the creation of customised mdv doctor prog. @£ 11.50c

SEWINDER amazing PRINT utilities Screen dumps to any size from postage stamp to 20ft banners Prints sideways, inverts & scales @£13.80c

MONITORS 85 Characters (Price including lead)

Philips BM7502 Green Hi-Res @£ 89.70a

Philips BM7522 Amber Hi-Res @£ 92.00a

Philips CM8833 "new" Colour Med-Res @£289.80a

Philips AV7300 Tv/Tuner for above @£ 74.75b

Philips Tv/Monitor 1010 @£262.20a

Remote Tv/Monitor 1210 @£279.45a

READYMADE LEADS

RGB QL DIN to Phono @£ 5.29c

RGB 8-6 pin DIN @£ 5.29c

RGB 8-7 pin DIN (Hitachi) @£ 6.90c

RGB 8-7 pin DIN (Ferguson) @£ 6.90c

RGB 8 pin to SCART (Euro) @£ 9.20c

6way PCC-25way 'D' (Printer-Ser1) @£ 9.20c

PSION ORGANISER

P.O.A.

HOW TO ORDER:

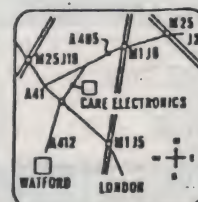
ALL PRICES INCLUDE VAT

By Post. Enclose your Cheque/P.O. made payable to CARE Electronics. Or use ACCESS/VISA. Allow 7 days for delivery.

Please add carriage. a-£10.35 b-£5.75 c-£1.15 d-£2.30



800 ST ALBANS ROAD,
GARSTON, WATFORD,
HERTS. WD2-6NL.
Tel: 0923-672102



ALL NEW
PRICES

BYTEBACK

THE QL

SPECIALIST

QUEST FOR THE DRAGON SWORD

A challenging text adventure with a large vocabulary, hundreds of locations, mazes of original puzzles and several sheep...

"Witty, difficult and entertaining! How could anyone wish for more?"... QL World Nov '87

"I laughed until I stopped!" B Bagins

£14.95

Detacad 2 by Datakey

User friendly CAD for plotters **£17.50**

Datakey by Datakey

Stock control and database **£14.00**

GAMES

Only

Only

Tank Busters.....	Sellsoft	14.00	Scrabble.....	L Genius	12.50
Type-22.....	Talent	16.00	Spook.....	Eidersoft	9.00
Hover Zone.....	Talent	12.50	Karate.....	Eidersoft	12.50
Farmer.....	Talent	12.50	BJ the Return.....	Eidersoft	8.00
Deathstrike.....	Talent	12.50	BJ in 3D Land.....	Eidersoft	7.00
Strip Poker.....	Talent	12.50	Citadel.....	Eidersoft	7.00
Jungle Eddi.....	Talent	12.50	Zapper & Eagle.....	Eidersoft	7.00
Lost Pharaoh.....	Talent	12.50	Stone Raider 2.....	Microdeal	12.50
Blocklands.....	Digital	8.50	Flight Simulator.....	Microdeal	12.50
Droidzone.....	Digital	8.50	3D Chess.....	Psion	17.00
Super Backgammon.....	Digital	11.00	Match Point.....	Psion	12.50
Super Croupier.....	Pyramide	12.50	Caverns.....	Sinclair	7.00
Mister Smith.....	Pyramide	8.00	Meteor Storm.....	Sinclair	7.00
Vroom.....	Pyramide	13.00	QL Defusion.....	Realtime	8.50
Wanderer.....	Pyramide	17.00	3D Slime.....	Datalink	11.00
Othello 3D.....	Pyramide	17.00	Hyperdrive.....	English	12.50
Bridge Player 2.....	C.P.Soft	16.00	S. Davis Snooker.....	CDS	12.50

ADVENTURES

Only

Only

Horroraday.....	Talent	12.50	West.....	Talent	12.50
Nemesis.....	Talent	12.50	Zkul.....	Talent	12.50
Dragonhold.....	Rubicon	12.50	Mortville Manor.....	Pyramide	17.00

ART & DESIGN

Only

Only

TechniQL.....	Talent	43.00	The Designer.....	Pyramide	17.00
Technikit.....	Talent	21.00	Nucleon.....	Pyramide	17.00
PCB Designer 1.....	Talent	85.00	Graphic Toolkit.....	Pyramide	12.50
PCB Designer 2.....	Talent	45.00	Super Sprite Gen.....	Digital	25.00
GraphiQL +.....	Talent	21.00	Eye-Q.....	Digital	25.00
Sign Designer.....	D.S. Ents	16.00	Viewpoint 3D.....	Rubicon	17.00

PROGRAMMING

Only

Only

Supercharge.....	Digital	42.00	Assembler Dev. Kit.....	Metacomco	34.00
Turbo + Toolkit.....	Digital	84.00	C Dev. Kit.....	Metacomco	79.00
SuperForth.....	Digital	34.00	Pascal Dev. Kit.....	Metacomco	75.00
Better Basic.....	Digital	21.00	Lisp Dev. Kit.....	Metacomco	49.00
Assembler W'kbench.....	Talent	21.00	Basic-Ally.....	Talent	25.00

UTILITIES

Only

Only

Front Page.....	Gap	21.00	Front Page Extra.....	Gap	35.00
Task Master.....	Sector	24.00	Desktop Publisher.....	Digital	59.00
Spellbound.....	Sector	29.00	The Editor.....	Digital	25.00
Touch Typist.....	Sector	11.00	Editor Special Ed.....	Digital	35.00
Qspell (mdv).....	Eidersoft	15.00	Super Media Mgr.....	Digital	34.00
Qspell (disk).....	Eidersoft	19.00	Pro Astrologer.....	Digital	45.00
ICE (Eprom).....	Eidersoft	25.00	Super Astrologer.....	Digital	21.00
*Drawing Office.....	Eidersoft	15.00	Cosmos.....	Talent	12.50
*Ice.....	Eidersoft	12.50	Wimp Designer.....	Talent	13.00
*ICE Toolkit.....	Eidersoft	11.00	Oimp.....	Talent	21.00
*ChoICE.....	Eidersoft	14.50	Sideways.....	Talent	17.00
*ArtICE.....	Eidersoft	12.50	QL Toolset.....	Talent	17.00
*ICE Berg.....	Eidersoft	12.50	Cartridge Doctor.....	Talent	12.50

HARDWARE

Only

Only

Joystick Adaptor.....	4.50	Microdrive Cartridges.....	1.80
Suncom joystick.....	6.50	4 Cartridges in Wallet.....	4.50
Quickshot 2 joystick.....	8.00	Transform Storage Box.....	4.50
Quickshot TURBO joystick.....	13.00	20 Cartridges in Transform Box.....	39.00
The ARCADE joystick.....	17.00	Miracle Expanderam 512.....	75.00
Miracle Trump Card.....	189.00	Miracle Centronics Interface.....	18.00
Miracle QL Modem.....	45.00	3.5" Disks (10"DS/DD).....	12.00
Star NLQ Printer.....	229.00	Atari 520 ST-FM.....	275.00

SPECIAL OFFERS

Only

4 Game Pack (BJ Returns, Citadel, Zapper and Eagle).....	15.00
QL Technical Guide.....	17.00

ALL PRICES INCLUDE VAT AND FIRST CLASS POST
TELEPHONE (0636) 79097 FOR PERSONAL ASSISTANCE

Send Cheque/PO to:

BYTEBACK

6, Mumby Close, Newark,
Notts NG24 1JE

CHRISTMAS

LE
A
R
A
N
C
E

ALL Q.L.
SOFTWARE
AVAILABLE AT
KNOCK DOWN
PRICES.

WHY NOT PHONE
TODAY

0229 44753
or 29109

W.A.V.E.

Walney Audio Visual & Electrical

53 Shearwater Crescent, Barrow-in-Furness

Cumbria LA14 3JP Telephone: 0229 44753/29109

Hours: Mon-Fri 10-5.00

Data-Skip presents...Seiko RC-1000, Wrist Terminal



JOE BROWN
213-123-4567

MEETING 335
10/15 A10:30

DANCE LESSON
5 FRI P06:00

FRANKFURT
AM 02:08 42

84 10/14 A
SUN 10: 08 42

Memo Function. Can be used to store telephone numbers, client lists, schedules input from a personal computer. There's no limit to its uses. Data entries have a maximum length of 24 characters, and can be output on the watch display whenever you wish. The Memo function is the heart of the Wrist Terminal.

Schedule Alarm Function. Input the month, day, hour, and minute, for schedule entries and your Wrist Terminal alert you when the date and time come by beeping and displaying a twelve-character message on the screen. Invaluable for the businessman, of course, but the Wrist Terminal can also remind you of special personal days, for example, birthdays or anniversaries, that are so embarrassing to forget.

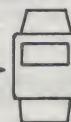
Weekly Alarm Function. Tuesdays at 9:30 there's a meeting. Thursdays at 7:00 you go to your sports club. Fridays...The Weekly Alarm function is just the thing for today's busy people. Input the day of the week, hour, and minute, and each week at the proper time the Wrist Terminal will beep and display a twelve-character message to remind you.

World Time Function. What time is it now in London? New York? Just input the time differences and afterward you can know the time anywhere in the world, instantly, with this internationally oriented function. Be sure to input the place name, too, in up to twelve characters.

Watch Function. The Wrist Terminal has a full set of Time Keeping functions, including a built-in alarm which will beep at the same time each day and a calendar which will automatically tell you the year, month, and day accurately from now until the year 2020. It has an hourly time signal, too.



QL SER1



The Seiko RC-1000 is a wrist-terminal with 2K of free memory to store addresses, telephone numbers etc. (max. 80).

Also has extensive alarm-facilities. Fully programmable on your QL. Data-transmission via Ser-1 port. Complete package (containing Transmission Software, interconnecting-cable and Watch)

Now only..... **£49.95**

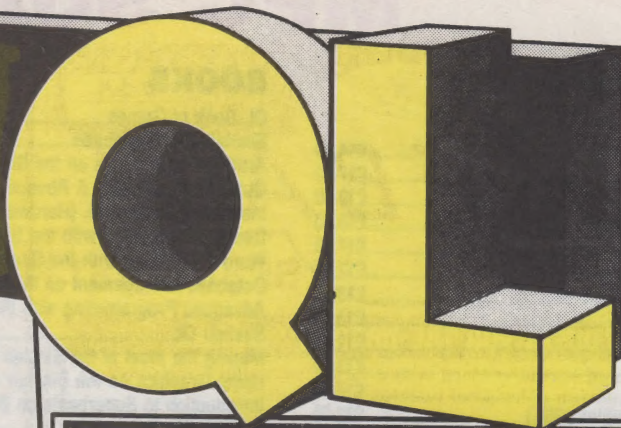
(Also Spectrum/interface I versions available. Please state)

Please add £1 for P & P. Orders: send us a cheque or postal order.

(No Visa or C.O.D.) made payable to:

DATA-SKIP, OOST Haven, 58, 2801 PE Gouda, Holland
Tel: 1820-20581

RELEASE THE POWER OF THE



QLC £99.95 inc VAT

A professional specification C compiler for the QL. Designed by **LATTICE®**, QL is the most powerful and complete C compiler available for the QL.
 ► Complete Kernighan and Ritchie implementation. ► Full floating point arithmetic. ► Comprehensive library of UNIX and QDOS functions.
 ► Separate compilation. Linker. ► Powerful data types (inc. structures and arrays). ► Macros and conditional compilation. ► Over 90 detailed error messages.

ASSEMBLER

£39.95 inc VAT

The best selling macro assembler for the QL.
 ► Full Motorola 68000 specification ► Macro expansions. ► Linker, directives, conditional assembly, and many other professional features.

QL PASCAL

NEW VERSION

£89.95 inc VAT

A full ISO standard Pascal compiler.
 ► Fast, single pass Pascal compiler ► Complete implementation of the ISO 7185 Pascal standard. ► Generated native code. Can be linked to assembler modules. ► Comprehensive error handling. ► Easy interfaces to QL features.

BCPL

£59.95 inc VAT

A true compiler.
 Ideal for systems programming-utilities, games, and applications.

LISP

£59.95 inc VAT

LISP interpreter for exploring 'the language of artificial intelligence', with graphics.

QL APL

£99.95 inc VAT

Keyword and Symbolic versions of this powerful APL interpreter by Micro APL. All standard APL facilities implemented with no restrictions and many extra features.

METACOMCO

26 Portland Square, Bristol BS2 8RZ

Tel: Bristol (0272) 428781

In the USA call 1-800-252-6382

Trademarks: UNIX-AT-T Bell Laboratories, QL, QDOS—Sinclair Research Limited

Prices include VAT, postage and packaging UK mainland only. Delivery, allow up to 28 days

Phone today or post this coupon to:

Metacomco, 26 Portland Square, Bristol BS2 8RZ.

I enclose a cheque for £ or debit my ACCESS/VISA

No: CARD EXPIRY DATE

NAME

ADDRESS

POSTCODE TEL:

SIGNATURE

Please send me:

- ☐ Assembler £39.95
- ☐ LISP £59.95
- ☐ BCPL £59.95
- ☐ QLC £99.95
- ☐ QL PASCAL £89.95
- ☐ QL APL (Keyword) £99.95
- ☐ QL APL (Symbolic) £99.95
- ☐ More information

Take the brakes off your QL display!

SPEEDSCREEN

SPEEDSCREEN makes QL display output up to **TWELVE TIMES** faster! It replaces Sinclair's slow routines with **NEW OPTIMISED** code by Simon N Goodwin, designer of TURBO and SUPERCHARGE.

You don't need any specialist knowledge or effort to use SPEEDSCREEN. Just load it! SPEEDSCREEN works with existing programs, without alteration. Tests show dramatic speed improvements on:

QUILL, THE EDITOR, COPY, LIST, PRINT, ED, VIEW, TURBO, ABACUS, ICE, GRAM, FRONT PAGE, PASCAL, C, FORTRAN, QLIB, FORTH, ARCHIVE, FLASHBACK, etc., etc.

SPEEDSCREEN works on all QL versions and configurations (inc. the Psion packages on unexpanded QLs), TVs or Monitors.

SPEEDSCREEN boosts user-defined graphics and text output in CSIZE 0, 0 and CSIZE 1, 0 — the sizes used by most commercial programs. It handles OVER, UNDER, all solid colours and 64 stipples. Features that are not optimised (e.g. CSIZE 2) work as usual, and can be freely mixed.

Displays look just as normal, but are drawn much faster — text is output 3.8 to 12.6 times faster depending on INK, OVER etc. SPEEDSCREEN works with all MODE 4 programs. One copy can speed up any number of tasks.

By default SPEEDSCREEN accelerates scrolling to twice the normal speed (e.g. LIST & COPY). The new command — SCROLL allows higher rates — up to 8.2 times normal. You set the rate to match your reading speed. BREAK and CTRL—F5 still work, of course.

SPEEDSCREEN allows improved fonts (supplied) — including a new, more flexible 72-pixel format printed over TWELVE times faster than normal 45-pixel characters. SPEEDSCREEN also supports many NEW fast CSIZES.

Timings publicly demonstrated to QUANTA, the Independent QL User Group, 7/9/87. Timings assume SPEEDSCREEN is in fast RAM, or ROM (coming soon). Speedups for

slow internal RAM are typically 31 per cent smaller. Tests used interpreted SuperBASIC. The exact speedup in any program depends upon its efficiency and what else it is doing.

"SPEEDSCREEN removes the QL screen bottleneck and lets you discover the true speed of your programs" — CHAS DILLON, author of The Editor.

FAST MAIL ORDER ONLY

SPEEDSCREEN costs £20 including first class or airmail postage anywhere. PAYMENT MUST BE IN STERLING: UK P.O.s, Eurocheques, Bank Drafts or cheques drawn on a UK bank. 7 day service. Please state disk size or cartridge. Available now.

P.O. BOX 1095, BIRMINGHAM B17 0EJ, U.K. ☎ 021 426 5199

Creative CodeWorks

Trademarks acknowledged



RELEASE 3-1

Q-Liberator release 3-1 is packed with advanced features that take SuperBASIC programming into a new dimension.

Now selected procedures and functions within any compiled program can be called by other programs — even interpreted ones. Your programs can become just like assembler extensions in the RESPR area. A unique OVERLAY command also lets you load libraries only when you need them. Reclaim the space later with the UNLOAD command. With parameter passing, GLOBAL variables and FREE RUNNING PROCEDURES which run independently of the job that starts them you have a totally new programming environment. All this is controlled by a configurable front end with online HELP for every facility. If you have QRAM then QLIB can be hotkeyed and mouse driven. Other features include * ROMable code generation * Automatic integer FOR NEXT loops * Fast compilation * and, of course,

£59.95

"Virtually complete compatibility" — Q.L. World Sept. 1987

COMPILER PRICE BREAKTHROUGH Q-LIBERATOR BUDGET VERSION

£29.95

Not as fast and not as sophisticated as 3.1 but still a powerful tool that anyone can afford. Contains all the original Q-Liberator features like job control, error trapping, channel sharing, PIPES and no codesize limit. For benchmarks see QL World April 1987.

QLOAD & QREF

Together only

£9.95

QLOAD is a universal quick loader for SuperBASIC programs that dramatically cuts loading times. Even a 200K+ program loads in under a minute! The perfect complement to Q-Liberator, QLOAD has no restrictions on portability. Simply indispensable. QREF is a resident utility for cross referencing SuperBASIC programs with wildcard selection of variables, procedures, functions and machine code routines. Includes FIND facility for the EDIT command.

"An invaluable utility", "certainly not a product to be missed" Q.L. World Aug. 1987

Q-Liberator 3- 3.5 flp or mdv	£59.95	Upgrade from REL 2 to REL 3	£10.00
Q-Liberator 3- in 64K ROM	ring	Upgrade Budget to REL 3	£30.00
ROM expansion board	ring	QLOAD and QREF mdv	£9.95
QLIB Budget version 3.5 flp or mdv	£29.95	QLOAD and QREF 3.5 flp	£10.95

Prices include post, packing and VAT in UK, or airmail postage to Europe. US distributor: Sharps Inc, Route 10, Box 459, Mechanicsville, VA2311.

Please make cheque/PO payable to:

Liberation Software
 43 CLIFTON ROAD
 KINGSTON UPON THAMES KT2 6PJ
 Tel: 01-546 7795

MAIL ORDER ONLY

MPC SOFTWARE

SOFTWARE

GAMES

Arkanoid.....	£14.00
Chess.....	£17.00
Deathstrike.....	£13.00
Eldersoft 3 Pack.....	£15.00
Flight.....	£17.00
Lord Pharaoh.....	£13.00
Scrabble.....	£13.00
Strip Poker.....	£13.50
Tank Busters.....	£12.00
Vroom.....	£13.50
Wanderer.....	£17.00
Macro Assembler (GST).....	£32.00

BUSINESS

Cash Trader (mdv-disc).....	£40.00
Concept 3D.....	£28.00
Front Page.....	£21.00
Project Planner.....	£25.00
Spellbound (disc-mdv).....	£29.00
Taskmaster.....	£23.00
Qwriter II.....	£17.00

LANGUAGES

Assembler Workbench.....	£36.00
Assembler (GST).....	£20.00
Macro Assembler (GST).....	£32.00

UTILITIES

Bag of Tricks 1 & 2.....	£10.00
Cartridge Doctor.....	£13.50
Copier.....	£ 7.00
Font Designer.....	£ 5.00
Graphic Toolkit.....	£13.00
QFlash & Toolkit.....	£19.00
QFlash ROM.....	£23.00
QL Paint (GraphicQL+).....	£18.00
RAM Disc.....	£14.00
Shrink.....	£ 5.00
QL Peinire.....	£11.00

We have a large range of reduced priced software

TELEPHONE

for further details

BOOKS

QL Book of Games.....	£ 4.00
Sinclair QL Adventures.....	£ 2.50
Artificial Intelligence on the Sinclair QL.....	£ 3.00
Quill, Archive, Easel & Abacus on the QL.....	£ 4.00
Inside the Sinclair QL (Hardware).....	£ 5.00
Desktop Computing with the Sinclair QL.....	£ 3.00
Word Processing with the Sinclair QL.....	£ 3.00
Database Management on the Sinclair QL.....	£ 3.00
Advanced Programming with the Sinclair QL.....	£ 4.00
Making the most of the Sinclair AL.....	£ 4.00
Using Graphics on the Sinclair QL.....	£ 3.95
Introduction to Superbasic on the Sinclair QL.....	£ 3.00
Introducing the Sinclair QL.....	£ 3.50
Profiting from the QL (Abacus).....	£ 3.50
QL Computing.....	£ 4.00
QL Advanced User Guide (QDOS).....	£15.00
Quantum Theory.....	£ 4.00
QL Quill.....	£ 4.50
QL Easel.....	PHONE
Assembly Language Programming on the Sinclair QL.....	£ 7.95
QL Service Manual.....	£19.95
Hackers Handbook.....	£ 4.00
Creating Adventure Programmes on your Computer.....	£ 2.50
QL Handbook.....	£ 5.95
QL Companion.....	£ 5.95
Exploring Artificial Intelligence on the QL.....	£ 3.50
Computer Art & Graphics.....	£ 4.00
Xenix Users Guide.....	£ 5.00
How to computerise your business successfully.....	£ 3.00

QL Computers

New: £150.00 'Shop Soiled': £100.00

Special Offers

Tankbusters & Deathstrike.....	£20.00
Macro Assembler, QDOS Companion & Assembly Language Book.....	£35.00
7 Hutchinson Books (Worth over £50.00).....	£10.00
Mr Smith & Quboids.....	£15.00

While stocks last only.

TECHNI QL

Techni QL is a two dimensional CAD package available for all general and engineering applications. It allows the user to create accurate and finely detailed plans, diagrams and designs. These can then be printed out to any width on any epsom or eprom compatible printers.

FEATURES INCLUDED:

Fast multi width printer output
Menu or mouse driven
Windows any drawings much larger than the screen
Multiple zooms (in or out)
Compressed storage of designs
Two screen modes
Up to 75 cells can be created
Cells can be edited, mirrored, rotated, scaled and positioned accurately on top of other cells
Grid and grid snap
Up to eight grids per design
Text can be mixed freely
Relocatable code (compatible with disks/extra ram)

SUITABLE FOR:

Flow charting, electrical design, mechanical drawing, letterheads/logos, PERT charts, architectural drawing and much more.

SPECIAL LOW PRICE OF £30.00

7 QL Books for only £10.00

Introduction to Superbasic on the Sinclair QL
Make the most of the QL
Database Management on the QL
Introducing the Sinclair QL
Profiting from the QL
Word Processing on the QL
Desk Top Computing with the Sinclair QL

RRP over **£50.00**

Postage UK - Free, Europe - £8.00,
R.O.T.W. - Write

HARDWARE

DISC PRODUCTS

Disc Interface.....	£ 85.00
Interface & Single Drive.....	£185.00
Interface & Dual Drive.....	£275.00
Trump Card & Dual Drive.....	£345.00
90 x 3.5 Lockable Storage Box.....	£ 18.00
3.5" Disc Head Cleaner.....	£ 8.00

MEMORY PRODUCTS

Miracle Expanderam.....	£ 75.00
QFlash RAM Disc.....	£ 18.00
QFlash RAM Disc (ROM).....	£ 25.00
Trump Card.....	£185.00
Memory 'Shrink' Program.....	£ 5.00

PERIPHERALS

Centronics Printer Interface.....	£20.00
Serial Cable.....	£ 8.00
Keyboard Membrane.....	£ 8.00
Microdrive Cartridges.....	£ 1.80
4 Microdrives in Wallet.....	£ 7.60
Joystick Adapter.....	£ 4.60
Miracle Modern.....	£40.00
Schon Keyboard.....	£54.00
New Schon Keyboard.....	£99.00

POSTAGE TERMS

UK: FREE on orders over £10.00 — £1.00 on order under £10.00
Europe: £1.00 plus £1.00 per book — Outside Europe write

PRINTERS

	RRP	OUR
CITIZEN 120D.....	£240.00	£200.00
CITIZEN LSP10.....	£320.00	£220.00
CITIZEN LSP100.....	£400.00	£280.00
PANASONIC KXP1081.....	£300.00	£260.00

2 YEAR GUARANTEE on all CITIZEN PRINTERS

PLEASE PHONE FOR DETAILS ON
OTHER PRINTERS

QL spare & repairs *phone for more details*

MPC Software, 72 Julian Road, West Bridgeford, Nottingham, NG2 5AN
Telephone: (0602) 820106/455114

Mail Order only

PIRACY

THE GRANDMASTER OF ETERNITY SERIES



PIRACY is a mythologically based semi-arcade role-playing adventure game. Dark evil plagues it's land seduced by the gateways to hell in the shadowy depths of castle dungeons. So young Pirates beware, your chararter must prepare, if Eternity be your destined lair. The game can be configured with a variety of modes and options to play against the computer, or with other players in a network. Features include: 4-way scrolling 'hex-grid' map; Printer dump; 4-level map zoom; Free 2-user licence for 2 QL's; Free upgrades.

The 'GRANDMASTER OF ETERNITY SERIES' is a family of games linked together to form the largest epic in the history of games. It will take you in stages from the dawn of man to the ultimate destination in time and space.

Game-2: WARLOCK,	Game-3: PIRACY,	Game-4: WARSHIP
£19-95 Master-games	(128K QL)	Including:
£19-95 Grandmaster-games	(128K+256K/512K QL)	P&P, VAT.
£19-95 Grandmaster-games	Atari STFM, Amstrad colour	PC1512

COMPLEX DATA SYSTEMS (UK) LTD., [ENTERTAINMENT DIVISION],
6 Robertsfield, Thatcham, Newbury, Berkshire, RG13 4TW.

STRONG COMPUTER SYSTEMS

BRYN COTTAGE, PENIEL, CARMARTHEN, DYFED SA32 7DJ. TEL: 0267-231246

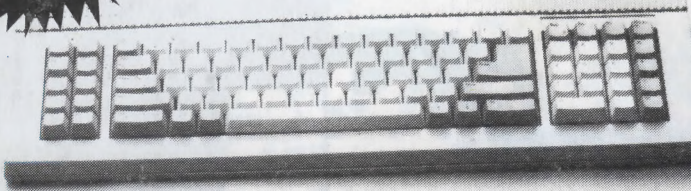


ALL PRICES
INCLUDE
VAT & CARR.

SUPERIOR REPLACEMENT QL KEYBOARD

£99

THIS HAS BEEN DESIGNED
FOR THE FUTURA MEETING
THE HIGHEST SPECIFICATIONS



FEATURES

- ERGONOMIC DESIGN
- NUMERIC KEYPAD
- FULL TRAVEL KEYS
- 10 FUNCTION KEYS
- ANTI BOUNCE
- EASY FITTING

LOWEST PRICES ON QL DISK SYSTEMS

SQB + MOUSE PORT + 512K + QRAM £199
SUPERQBOARD + 512K + QRAM £189
TRUMPCARD + QRAM £199
SQB OK + MOUSE PORT £ 89
SUPERQBOARD OK INC. TK2 £ 79
MOUSE FOR SUPERQBOARD £ 39
DUAL NEC DRIVES + 10 DISKS £189
SINGLE NEC DRIVE + 10 DISKS £119
NEC MECHANISM £ 79

BEST PRINTER BUY

SEIKOSHA SL80AI LQ PRINTER £379

FEATURES

- 24 PIN HEAD GIVING LETTER QUALITY
- PERFECT LETTER QUALITY 50 CPS
- DRAFT QUALITY 150 CPS
- INCLUDES PARALLEL INTERFACE

SPECIAL OFFER: PHILLIPS BM7502 MONITOR 20 MHZ WITH FREE TILT STAND £ 99
THE ASTRACOM 1000 MULTISTANDARD INTELLIGENT MODEM £198

Complete with Communications Software •• BT APPROVED ••

QUALITY PRINTER STAND Suitable for Any 80 Col Printer ONLY £ 59
SET OF 6 BOOKS £ 19 •• FUTURA PLEASE CALL ••
128K QL COMPUTER £149 640K QL COMPUTER £239
10 DS/DD 3.5" DISKS IN CASE £ 16 SCHON KEYBOARD £ 57
SPECIAL OFFER: 20 3.5" DISKS + FREE STORAGE BOX FOR 40 DISKS £29

**SEE US AT THE
ZX MICROFAIR ON
THE 12TH DEC.**

QL REPAIRS 7 DAY SERVICE ... £28
EMERGENCY SERVICE £38

PRINTER PRICES INCLUDE MIRACLE SYSTEMS INTERFACE

SEIKOSHA 1300A1 300 CPS (colour option £100 extra) £399
MP135 (135 CPS) FRICTION & TRACTOR £199
CANON PW1080 £289
KAGA TAXAN KP910 £350
DAISYWHEEL MP26 (26 CPS) QUME COMPATIBLE £299
2000 Sheets Fanfold Paper Micro Perf £ 19
2000 Sheets Fanfold Paper (Supplied with printer) £ 16
MIRACLE SYSTEMS PARALLEL INTERFACE £ 20

ACCESSORIES

3250 WATT MAINS FILTER £ 36
MIRACLE SYSTEMS MODAPIOR £ 39
MICROSTICK JOYSTICK WITH ADAPTOR £ 16
20 CARTRIDGES WITH TRANSFORM BOX £ 40
10 CARTRIDGES WITH TRANSFORM BOX £ 23
4 Microdrive Cartridges £8 Transform Box £ 5
Joystick Adaptor £5 Para Cable for Memodisk £10
Serial Printer Cable £8 10 DS/DD 3.5" Disks ... £19

MONITORS (Cables Included)

Microvitic Cub 1451/DQ3 Colour £249
Microvitic Cub 1451/DQT3 with Swivel Stand £269
Swivel Stand for Microvitic £ 25
Phillips BM7502 20MHZ Green (RECOMMENDED FOR THE QL) £ 99

RIBBONS

BROTHER M1009 £5 M180 or Shiniwa £ 6
QUEEN DATA £6 SP1000A (Sinclair) £ 7
TAXAN/CANON £8 EPSON RX/MX/FX £ 6
EPSON I X80 £5 CITIZEN 120D £ 6

BUSINESS

INVESTMENT MONITOR £ 19
PBC DESIGNER 1 £ 89
PCB DESIGNER 2 £ 89
TALENT TECHNIQUE £ 44
CONCEPT 3D CAD £ 34
RUBICON VIEWPOINT CART/DISK £ 24
DIGITAL EYE Q £ 24
QDRAW £ 14
SIGN DESIGNER £ 19
FRONT PAGE £ 24
PRO ASTROLOGER CART/DISK £ 49
PRO ASTROLOGER + ASTRONOMER £ 59
QL SERVICE MANUAL £ 19
DESK TOP PUBLISHER CART/DISK £ 69

LEISURE

TALENT WEST £ 12
TALENT ZKUL £ 12
TALENT COSMOS £ 12
TALENT THE LOST PHAROAH £ 13
TALENT JUNGLE EDDI £ 13
TALENT NEMESIS £ 13
TALENT OXFORD TRIVIA £ 16
TALENT STRIP POKER £ 13
DIGITAL SUPERBACKGAMMON £ 11
DIGITAL BLOCKLANDS £ 9
TALENT HOVERZONE £ 14
TALENT FARMER £ 14

Software

LANGUAGES

METACOMCO ASSEMBLER £ 29
METACOMCO BCPL £ 49
METACOMCO LISP £ 49
METACOMCO PASCAL £ 69
METACOMCO 'C' £ 79
PRO FORTRAN £ 89
PRO PASCAL £ 89
DIGITAL TURBO £ 89
TALENT WORKBENCH £ 19
QL LIBERATOR £ 59
FORTH + REVERSI £ 35

BRIDGE PLAYER II £ 17
WAR IN THE EAST COMPLETE £ 39
WAR IN THE EAST (SCEN. 1) £ 20
WAR IN THE EAST (SCEN. 2 OR 3) £ 13
PSION CHESS £ 16
PSION MATCHPOINT £ 12
RUBICON DRAGONHOLD £ 14
LEISURE GENIUS SCRABBLE £ 12
HYPERDRIVE £ 12
DIGITAL DROIDZONE £ 9
DIGITAL SUPER ARCADIA £ 9
TALENT DEATHSTRIKE £ 14
TALENT HORRORDAY £ 14

UTILITIES

DIGITAL MEDIA MANAGER £ 35
THE EDITOR ON CART (128K VER.) £ 29
THE EDITOR ON DISK (640K VER.) £ 39
TALENT TECHNIKIT £ 24
TALENT QIMP £ 29
TALENT BASIC ALLY £ 29
DISK & PRINT SPOOLER £ 9
TALENT SIDWAYS £ 19
DIGITAL SPRITE GENERATOR £ 29
LOCKSMITH £ 12
4 MATTER £ 12
QMON MONITOR/DEBUGGER £ 18
TALENT CARTRIDGE DOCTOR £ 13
TASKMASTER £ 25

OMEGA (DISK 3.5") £ 15
OMEGA (CART) £ 14
STEVE DAVIS SNOOKER £ 12
SLLASOF1 TANKBUSTERS £ 14
TALENT HOVERZONE £ 14
STONE RAIDER II £ 13
SQUADRON £ 13
TOUCH TYPIST £ 12
DATALINK 3D SHIMP £ 11
HEART OF GERN (NEW ADVENTURE) £ 15
DIGITAL SUPER ASTROLOGER £ 22
TALENT TYPE 22 (TACTICAL) £ 17

EXPORT AND TRADE ENQUIRIES PLEASE CALL.